

SEQUENCE LISTING

(1) GENERAL INFORMATION:

- (i) APPLICANT: Daggett, Lorrie P.
Ellis, Steven B.
Liaw, Chen W.
Lu, Chin-Chun
- (ii) TITLE OF INVENTION: HUMAN N-METHYL-D-ASPARTATE RECEPTOR
SUBUNITS, DNA ENCODING SAME AND USES THEREFOR
- (iii) NUMBER OF SEQUENCES: 21
- (iv) CORRESPONDENCE ADDRESS:
 - (A) ADDRESSEE: Pretty, Schroeder, Brueggemann & Clark
 - (B) STREET: 444 South Flower Street, Suite 2000
 - (C) CITY: Los Angeles
 - (D) STATE: CA
 - (E) COUNTRY: U.S.A.
 - (F) ZIP: 90071-2921
- (v) COMPUTER READABLE FORM:
 - (A) MEDIUM TYPE: Floppy disk
 - (B) COMPUTER: IBM PC compatible
 - (C) OPERATING SYSTEM: PC-DOS/MS-DOS
 - (D) SOFTWARE: PatentIn Release #1.0, Version #1.25
- (vi) CURRENT APPLICATION DATA:
 - (A) APPLICATION NUMBER:
 - (B) FILING DATE: 20-APR-1994
 - (C) CLASSIFICATION:
- (vii) PRIOR APPLICATION DATA:
 - (A) APPLICATION NUMBER: US 08/052,449
 - (B) FILING DATE: 20-APR-1993
- (viii) ATTORNEY/AGENT INFORMATION:
 - (A) NAME: Reiter, Stephen E.
 - (B) REGISTRATION NUMBER: 31,192
 - (C) REFERENCE/DOCKET NUMBER: P41 9424
- (ix) TELECOMMUNICATION INFORMATION:
 - (A) TELEPHONE: 619-546-4737
 - (B) TELEFAX: 619-546-9392

(2) INFORMATION FOR SEQ ID NO:1:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 4298 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: both
 - (D) TOPOLOGY: both
- (ii) MOLECULE TYPE: cDNA
- (ix) FEATURE:
 - (A) NAME/KEY: CDS
 - (B) LOCATION: 262..3078

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

| | |
|--|-----|
| CAAGCCGGGC GTTCGGAGCT GTGCCCCGCC CCGCTTCAGC ACCGCGGACA GCGCCGGCCG | 60 |
| CGTGGGGCTG AGCGCCGAGC CCCC GCGCAC GCTTCAGCCC CCCTTCCCTC GGCCGACGTC | 120 |
| CCGGGACCGC CGCTCCGGGG GAGACGTGGC GTCCGAGCC CGCGGGGCCG GGCGAGCGCA | 180 |
| GGACGGCCCC GAAGCCCCGC GGGGGATGCG CCGAGGGCCC CGCGTTCGCG CCGCGCAGAG | 240 |
| CCAGGCCCGC GGCCCGAGCC C ATG AGC ACC ATG CGC CTG CTG ACG CTC GCC | 291 |
| Met Ser Thr Met Arg Leu Leu Thr Leu Ala | 10 |
| 1 5 | |
| CTG CTG TTC TCC TGC TCC GTC GCC CGT GCC GCG TGC GAC CCC AAG ATC | 339 |
| Leu Leu Phe Ser Cys Ser Val Ala Arg Ala Ala Cys Asp Pro Lys Ile | 25 |
| 15 20 | |
| GTC AAC ATT GGC GCG GTG CTG AGC ACG CGG AAG CAC GAG CAG ATG TTC | 387 |
| Val Asn Ile Gly Ala Val Leu Ser Thr Arg Lys His Glu Gln Met Phe | 40 |
| 30 35 | |
| CGC GAG GCC GTG AAC CAG GCC AAC AAG CGG CAC GGC TCC TGG AAG ATT | 435 |
| Arg Glu Ala Val Asn Gln Ala Asn Lys Arg His Gly Ser Trp Lys Ile | 55 |
| 45 50 | |
| CAG CTC AAT GCC ACC TCC GTC ACG CAC AAG CCC AAC GCC ATC CAG ATG | 483 |
| Gln Leu Asn Ala Thr Ser Val Thr His Lys Pro Asn Ala Ile Gln Met | 70 |
| 60 65 | |
| GCT CTG TCG GTG TGC GAG GAC CTC ATC TCC AGC CAG GTC TAC GCC ATC | 531 |
| Ala Leu Ser Val Cys Glu Asp Leu Ile Ser Ser Gln Val Tyr Ala Ile | 90 |
| 75 80 85 | |
| CTA GTT AGC CAT CCA CCT ACC CCC AAC GAC CAC TTC ACT CCC ACC CCT | 579 |
| Leu Val Ser His Pro Pro Thr Pro Asn Asp His Phe Thr Pro Thr Pro | 105 |
| 95 100 | |
| GTC TCC TAC ACA GCC GGC TTC TAC CGC ATA CCC GTG CTG GGG CTG ACC | 627 |
| Val Ser Tyr Thr Ala Gly Phe Tyr Arg Ile Pro Val Leu Gly Leu Thr | 120 |
| 110 115 | |
| ACC CGC ATG TCC ATC TAC TCG GAC AAG AGC ATC CAC CTG AGC TTC CTG | 675 |
| Thr Arg Met Ser Ile Tyr Ser Asp Lys Ser Ile His Leu Ser Phe Leu | 135 |
| 125 130 | |
| CGC ACC GTG CCG CCC TAC TCC CAC CAG TCC AGC GTG TGG TTT GAG ATG | 723 |
| Arg Thr Val Pro Pro Tyr Ser His Gln Ser Ser Val Trp Phe Glu Met | 150 |
| 140 145 | |
| ATG CGT GTC TAC AGC TGG AAC CAC ATC ATC CTG CTG GTC AGC GAC GAC | 771 |
| Met Arg Val Tyr Ser Trp Asn His Ile Ile Leu Leu Val Ser Asp Asp | 170 |
| 155 160 165 | |
| CAC GAG GGC CGG GCG GCT CAG AAA CGC CTG GAG ACG CTG CTG GAG GAG | 819 |
| His Glu Gly Arg Ala Ala Gln Lys Arg Leu Glu Thr Leu Leu Glu Glu | 185 |
| 175 180 | |
| CGT GAG TCC AAG GCA GAG AAG GTG CTG CAG TTT GAC CCA GGG ACC AAG | 867 |
| Arg Glu Ser Lys Ala Glu Lys Val Leu Gln Phe Asp Pro Gly Thr Lys | 200 |
| 190 195 | |
| AAC GTG ACG GCC CTG CTG ATG GAG GCG AAA GAG CTG GAG GCC CGG GTC | 915 |
| Asn Val Thr Ala Leu Leu Met Glu Ala Lys Glu Leu Glu Ala Arg Val | 215 |
| 205 210 | |

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|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| ATC Ile 220 | ATC Ile 220 | CTT Leu 220 | TCT Ser 220 | GCC Ala 220 | AGC Ser 225 | GAG Glu 225 | GAC Asp 225 | GAT Asp 225 | GCT Ala 230 | GCC Ala 230 | ACT Thr 230 | GTA Val 230 | TAC Tyr 230 | CGC Arg 230 | GCA Ala 230 | 963 |
| GCC Ala 235 | GCG Ala 235 | ATG Met 240 | CTG Leu 240 | AAC Asn 240 | ATG Met 240 | ACG Thr 240 | GGC Gly 245 | TCC Ser 245 | GGG Gly 245 | TAC Tyr 245 | GTG Val 245 | TGG Trp 245 | CTG Leu 250 | GTC Val 250 | GGC Gly 250 | 1011 |
| GAG Glu 255 | CGC Arg 255 | GAG Glu 255 | ATC Ile 255 | TCG Ser 255 | GGG Gly 255 | AAC Asn 260 | GCC Ala 260 | CTG Leu 260 | CGC Arg 260 | TAC Tyr 260 | GCC Ala 265 | CCA Pro 265 | GAC Asp 265 | GGC Gly 265 | ATC Ile 265 | 1059 |
| CTC Leu 270 | GGG Gly 270 | CTG Leu 270 | CAG Gln 270 | CTC Leu 270 | ATC Ile 270 | AAC Asn 275 | GGC Gly 275 | AAG Lys 275 | AAC Asn 275 | GAG Glu 275 | TCG Ser 280 | GCC Ala 280 | CAC His 280 | ATC Ile 280 | AGC Ser 280 | 1107 |
| GAC Asp 285 | GCC Ala 285 | GTG Val 285 | GGC Gly 285 | GTG Val 285 | GTG Val 285 | GCC Ala 290 | CAG Gln 290 | GCC Ala 290 | GTG Val 290 | CAC His 295 | GAG Glu 295 | CTC Leu 295 | CTC Leu 295 | GAG Glu 295 | AAG Lys 295 | 1155 |
| GAG Glu 300 | AAC Asn 300 | ATC Ile 300 | ACC Thr 300 | GAC Asp 305 | CCG Pro 305 | CCG Pro 305 | CGG Arg 305 | GGC Gly 310 | TGC Cys 310 | GTG Val 310 | GGC Gly 310 | AAC Asn 310 | ACC Thr 310 | AAC Asn 310 | ATC Ile 310 | 1203 |
| TGG Trp 315 | AAG Lys 315 | ACC Thr 315 | GGG Gly 320 | CCG Pro 320 | CTC Leu 320 | TTC Phe 320 | AAG Lys 320 | AGA Arg 320 | GTG Val 325 | CTG Leu 325 | ATG Met 325 | TCT Ser 325 | TCC Ser 325 | AAG Lys 330 | TAT Tyr 330 | 1251 |
| CGC Ala 335 | GAT Asp 335 | GGG Gly 335 | GTG Val 335 | ACT Thr 335 | GCT Gly 335 | CGC Arg 340 | GTG Val 340 | GAG Glu 340 | TTC Phe 340 | AAT Asn 340 | GAG Glu 345 | GAT Asp 345 | GGG Gly 345 | GAC Asp 345 | CGG Arg 345 | 1299 |
| AAG Lys 350 | TTC Phe 350 | GCC Ala 350 | AAC Asn 350 | TAC Tyr 350 | AGC Ser 355 | ATC Ile 355 | ATG Met 355 | AAC Asn 355 | CTG Leu 355 | CAG Gln 355 | AAC Asn 360 | CGC Arg 360 | AAG Lys 360 | CTG Leu 360 | GTG Val 360 | 1347 |
| CAA Gln 365 | GTG Val 365 | GGC Gly 365 | ATC Ile 365 | TAC Tyr 365 | AAT Asn 370 | GGC Gly 370 | ACC Thr 370 | CAC His 370 | GTC Val 370 | ATC Ile 375 | CCT Pro 375 | AAT Asn 375 | GAC Asp 375 | AGG Arg 375 | AAG Lys 375 | 1395 |
| ATC Ile 380 | ATC Ile 380 | TGG Trp 380 | CCA Pro 385 | GGC Gly 385 | GGA Gly 385 | GAG Glu 385 | ACA Thr 385 | GAG Glu 385 | AAG Lys 390 | CCT Pro 390 | CGA Arg 390 | GGG Gly 390 | TAC Tyr 390 | CAG Gln 390 | ATG Met 390 | 1443 |
| TCC Ser 395 | ACC Thr 395 | AGA Arg 395 | CTG Leu 400 | AAG Lys 400 | ATT Ile 400 | GTG Val 405 | ACG Thr 405 | ATC Ile 405 | CAC His 405 | CAG Gln 405 | GAG Glu 410 | CCC Pro 410 | TTC Phe 410 | GTG Val 410 | TAC Tyr 410 | 1491 |
| GTC Val 415 | AAG Lys 415 | CCC Pro 415 | ACG Thr 415 | CTG Leu 415 | AGT Ser 420 | GAT Asp 420 | GGG Gly 420 | ACA Thr 420 | TGC Cys 420 | AAG Lys 425 | GAG Glu 425 | GAG Glu 425 | TTC Phe 425 | ACA Thr 425 | GTC Val 425 | 1539 |
| AAC Asn 430 | GGC Gly 430 | GAC Asp 430 | CCA Pro 430 | GTC Val 435 | AAG Lys 435 | AAG Lys 435 | GTG Val 435 | ATC Ile 435 | TGC Cys 440 | ACC Thr 440 | GGG Gly 440 | CCC Pro 440 | AAC Asn 440 | GAC Asp 440 | ACG Thr 440 | 1587 |
| TCG Ser 445 | CCG Pro 445 | GGC Gly 445 | AGC Ser 445 | CCC Pro 445 | CGC Arg 450 | CAC His 450 | ACG Thr 450 | GTG Val 450 | CCT Pro 455 | CAG Gln 455 | TGT Cys 455 | TGC Cys 455 | TAC Tyr 455 | GGC Gly 455 | TTT Phe 455 | 1635 |
| TGC Cys 460 | ATC Ile 460 | GAC Asp 460 | CTG Leu 465 | CTC Leu 465 | ATC Ile 465 | AAG Lys 465 | CTG Leu 465 | GCA Ala 470 | CGG Arg 470 | ACC Thr 470 | ATG Met 470 | AAC Asn 470 | TTC Phe 470 | ACC Thr 470 | TAC Tyr 470 | 1683 |
| GAG Glu 475 | GTG Val 475 | CAC His 475 | CTG Leu 480 | GTG Val 480 | GCA Ala 480 | GAT Asp 480 | GGC Gly 485 | AAG Lys 485 | TTC Phe 485 | GGC Gly 485 | ACA Thr 485 | CAG Gln 485 | GAG Glu 485 | CGG Arg 485 | GTG Val 485 | 1731 |

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| AAC | AAC | AGC | AAC | AAG | AAG | GAG | TGG | AAT | GGG | ATG | ATG | GGC | GAG | CTG | CTC | 1779 |
| Asn | Asn | Ser | Asn | Lys | Lys | Glu | Trp | Asn | Gly | Met | Met | Gly | Glu | Leu | Leu | |
| | | | | 495 | | | | | 500 | | | | | 505 | | |
| AGC | GGG | CAG | GCA | GAC | ATG | ATC | GTG | GCG | CCG | CTA | ACC | ATA | AAC | AAC | GAG | 1827 |
| Ser | Gly | Gln | Ala | Asp | Met | Ile | Val | Ala | Pro | Leu | Thr | Ile | Asn | Asn | Glu | |
| | | | 510 | | | | | 515 | | | | | 520 | | | |
| CGC | GCG | CAG | TAC | ATC | GAG | TTT | TCC | AAG | CCC | TTC | AAG | TAC | CAG | GGC | CTG | 1875 |
| Arg | Ala | Gln | Tyr | Ile | Glu | Phe | Ser | Lys | Pro | Phe | Lys | Tyr | Gln | Gly | Leu | |
| | | 525 | | | | | 530 | | | | | 535 | | | | |
| ACT | ATT | CTG | GTC | AAG | AAG | GAG | ATT | CCC | CGG | AGC | ACG | CTG | GAC | TCG | TTC | 1923 |
| Thr | Ile | Leu | Val | Lys | Lys | Glu | Ile | Pro | Arg | Ser | Thr | Leu | Asp | Ser | Phe | |
| | 540 | | | | | 545 | | | | | 550 | | | | | |
| ATG | CAG | CCG | TTC | CAG | AGC | ACA | CTG | TGG | CTG | CTG | GTG | GGG | CTG | TCG | GTG | 1971 |
| Met | Gln | Pro | Phe | Gln | Ser | Thr | Leu | Trp | Leu | Leu | Val | Gly | Leu | Ser | Val | |
| 555 | | | | | 560 | | | | | 565 | | | | | 570 | |
| CAC | GTG | GTG | GCC | GTG | ATG | CTG | TAC | CTG | CTG | GAC | CGC | TTC | AGC | CCC | TTC | 2019 |
| His | Val | Val | Ala | Val | Met | Leu | Tyr | Leu | Leu | Asp | Arg | Phe | Ser | Pro | Phe | |
| | | | | 575 | | | | | 580 | | | | | 585 | | |
| GGC | CGG | TTC | AAG | GTG | AAC | AGC | GAG | GAG | GAG | GAG | GAG | GAC | GCA | CTG | ACC | 2067 |
| Gly | Arg | Phe | Lys | Val | Asn | Ser | Glu | Glu | Glu | Glu | Glu | Asp | Ala | Leu | Thr | |
| | | | 590 | | | | | 595 | | | | | 600 | | | |
| CTG | TCC | TCG | GCC | ATG | TGG | TTC | TCC | TGG | GGC | GTC | CTG | CTC | AAC | TCC | GGC | 2115 |
| Leu | Ser | Ser | Ala | Met | Trp | Phe | Ser | Trp | Gly | Val | Leu | Leu | Asn | Ser | Gly | |
| | | 605 | | | | | 610 | | | | | 615 | | | | |
| ATC | GGG | GAA | GGC | GCC | CCC | AGA | AGC | TTC | TCA | GCG | CGC | ATC | CTG | GGC | ATG | 2163 |
| Ile | Gly | Glu | Gly | Ala | Pro | Arg | Ser | Phe | Ser | Ala | Arg | Ile | Leu | Gly | Met | |
| | 620 | | | | | 625 | | | | | 630 | | | | | |
| GTG | TGG | GCC | GGC | TTT | GCC | ATG | ATC | ATC | GTG | GCC | TCC | TAC | ACC | GCC | AAC | 2211 |
| Val | Trp | Ala | Gly | Phe | Ala | Met | Ile | Ile | Val | Ala | Ser | Tyr | Thr | Ala | Asn | |
| 635 | | | | | 640 | | | | | 645 | | | | | 650 | |
| CTG | GCG | GCC | TTC | CTG | GTG | CTG | GAC | CGG | CCG | GAG | GAG | CGC | ATC | ACG | GGC | 2259 |
| Leu | Ala | Ala | Phe | Leu | Val | Leu | Asp | Arg | Pro | Glu | Glu | Arg | Ile | Thr | Gly | |
| | | | | 655 | | | | | 660 | | | | | 665 | | |
| ATC | AAC | GAC | CCT | CGG | CTG | AGG | AAC | CCC | TCG | GAC | AAG | TTT | ATC | TAC | GCC | 2307 |
| Ile | Asn | Asp | Pro | Arg | Leu | Arg | Asn | Pro | Ser | Asp | Lys | Phe | Ile | Tyr | Ala | |
| | | | 670 | | | | | 675 | | | | | 680 | | | |
| ACG | GTG | AAG | CAG | AGC | TCC | GTG | GAT | ATC | TAC | TTC | CGG | CGC | CAG | GTG | GAG | 2355 |
| Thr | Val | Lys | Gln | Ser | Ser | Val | Asp | Ile | Tyr | Phe | Arg | Arg | Gln | Val | Glu | |
| | | 685 | | | | | 690 | | | | | 695 | | | | |
| CTG | AGC | ACC | ATG | TAC | CGG | CAT | ATG | GAG | AAG | CAC | AAC | TAC | GAG | AGT | GCG | 2403 |
| Leu | Ser | Thr | Met | Tyr | Arg | His | Met | Glu | Lys | His | Asn | Tyr | Glu | Ser | Ala | |
| | 700 | | | | | 705 | | | | | 710 | | | | | |
| GCG | GAG | GCC | ATC | CAG | GCC | GTG | AGA | GAC | AAC | AAG | CTG | CAT | GCC | TTC | ATC | 2451 |
| Ala | Glu | Ala | Ile | Gln | Ala | Val | Arg | Asp | Asn | Lys | Leu | His | Ala | Phe | Ile | |
| 715 | | | | | 720 | | | | | 725 | | | | | 730 | |
| TGG | GAC | TCG | GCG | GTG | CTG | GAG | TTC | GAG | GCC | TCG | CAG | AAG | TGC | GAC | CTG | 2499 |
| Trp | Asp | Ser | Ala | Val | Leu | Glu | Phe | Glu | Ala | Ser | Gln | Lys | Cys | Asp | Leu | |
| | | | | 735 | | | | | 740 | | | | | 745 | | |
| GTG | ACG | ACT | GGA | GAG | CTG | TTT | TTC | CGC | TCG | GGC | TTC | GGC | ATA | GGC | ATG | 2547 |
| Val | Thr | Thr | Gly | Glu | Leu | Phe | Phe | Arg | Ser | Gly | Phe | Gly | Ile | Gly | Met | |
| | | | 750 | | | | | 755 | | | | | 760 | | | |

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|---|------|
| CGC AAA GAC AGC CCC TGG AAG CAG AAC GTC TCC CTG TCC ATC CTC AAG | 2595 |
| Arg Lys Asp Ser Pro Trp Lys Gln Asn Val Ser Leu Ser Ile Leu Lys | |
| 765 770 775 | |
| TCC CAC GAG AAT GGC TTC ATG GAA GAC CTG GAC AAG ACG TGG GTT CGG | 2643 |
| Ser His Glu Asn Gly Phe Met Glu Asp Leu Asp Lys Thr Trp Val Arg | |
| 780 785 790 | |
| TAT CAG GAA TGT GAC TCG CGC AGC AAC GCC CCT GCG ACC CTT ACT TTT | 2691 |
| Tyr Gln Glu Cys Asp Ser Arg Ser Asn Ala Pro Ala Thr Leu Thr Phe | |
| 795 800 805 810 | |
| GAG AAC ATG GCC GGG GTC TTC ATG CTG GTA GCT GGG GGC ATC GTG GCC | 2739 |
| Glu Asn Met Ala Gly Val Phe Met Leu Val Ala Gly Gly Ile Val Ala | |
| 815 820 825 | |
| GGG ATC TTC CTG ATT TTC ATC GAG ATT GCC TAC AAG CGG CAC AAG GAT | 2787 |
| Gly Ile Phe Leu Ile Phe Ile Glu Ile Ala Tyr Lys Arg His Lys Asp | |
| 830 835 840 | |
| GCT CGC CGG AAG CAG ATG CAG CTG GCC TTT GCC GCC GTT AAC GTG TGG | 2835 |
| Ala Arg Arg Lys Gln Met Gln Leu Ala Phe Ala Val Asn Val Trp | |
| 845 850 855 | |
| CGG AAG AAC CTG CAG GAT AGA AAG AGT GGT AGA GCA GAG CCT GAC CCT | 2883 |
| Arg Lys Asn Leu Gln Asp Arg Lys Ser Gly Arg Ala Glu Pro Asp Pro | |
| 860 865 870 | |
| AAA AAG AAA GCC ACA TTT AGG GCT ATC ACC TCC ACC CTG GCT TCC AGC | 2931 |
| Lys Lys Lys Ala Thr Phe Arg Ala Ile Thr Ser Thr Leu Ala Ser Ser | |
| 875 880 885 890 | |
| TTC AAG AGG CGT AGG TCC TCC AAA GAC ACG AGC ACC GGG GGT GGA CGC | 2979 |
| Phe Lys Arg Arg Arg Ser Ser Lys Asp Thr Ser Thr Gly Gly Gly Arg | |
| 895 900 905 | |
| GGT GCT TTG CAA AAC CAA AAA GAC ACA GTG CTG CCG CGA CGC GCT ATT | 3027 |
| Gly Ala Leu Gln Asn Gln Lys Asp Thr Val Leu Pro Arg Arg Ala Ile | |
| 910 915 920 | |
| GAG AGG GAG GAG GGC CAG CTG CAG CTG TGT TCC CGT CAT AGG GAG AGC | 3075 |
| Glu Arg Glu Glu Gly Gln Leu Gln Leu Cys Ser Arg His Arg Glu Ser | |
| 925 930 935 | |
| TGAGACTCCC CGCCCGCCCT CCTCTGCCCC CTCCCCGCA GACAGACAGA CAGACGGACG | 3135 |
| GGACAGCGGC CCGGCCACG CAGAGCCCCG GAGCACCACG GGGTCGGGGG AGGAGCACCC | 3195 |
| CCAGCCTCCC CCAGGCTGCG CCTGCCCGCC CGCCGGTTGG CCGGCTGGCC GGTCCACCCC | 3255 |
| GTCCCGGCCC CGCGCGTGCC CCCAGCGTGG GGCTAACGGG CGCCTTGTCT GTGTATTCT | 3315 |
| ATTTTGCAGC AGTACCATCC CACTGATATC ACGGGCCCGC TCAACCTCTC AGATCCCTCG | 3375 |
| GTCAGCACCG TGGTGTGAGG CCCCCGAGG CGCCACCTG CCCAGTTAGC CCGGCCAAGG | 3435 |
| ACACTGATGG GTCCTGCTGC TCGGGAAGGC CTGAGGGAAG CCCACCCGCC CCAGAGACTG | 3495 |
| CCCACCTGG GCCTCCCGTC CGTCCGCCG CCCACCCGC TGCCTGGCGG GCAGCCCCTG | 3555 |
| CTGGACCAAG GTGCGGACCG GAGCGGCTGA GGACGGGGCA GAGCTGAGTC GGCTGGGCAG | 3615 |
| GGCCGCAGGG CGCTCCGGCA GAGGCAGGCC CCTGGGGTCT CTGAGCAGTG GGGAGCGGGG | 3675 |
| GCTAACTGCC CCCAGGCGGA GGGGCTTGA GCAGAGACGG CAGCCCCATC CTTCCCGCAG | 3735 |
| CACCAGCCTG AGCCACAGTG GGGCCCATGG CCCCAGCTGG CTGGGTGGCC CCTCCTCGGG | 3795 |

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CGCCTGCGCT CCTCTGCAGC CTGAGCTCCA CCCTCCCCTC TTCTTGCGGC ACCGCCACAC 3855
 AAACACCCCG TCTGCCCCCTT GAGGCCACAC GCCGGGGCTG GCGCTGCCCT CCCCCACGGC 3915
 CGTCCCTGAC TTCCAGCTG GCAGCGCCTC CCGCCGCCTC GGGCCGCCTC CTCCAGAATC 3975
 GAGAGGGCTG AGCCCCCTCT CTCCTCGTCC GGCCTGCAGC ACAGAAGGGG GCCTCCCCGG 4035
 GGGTCCCCCG ACGCTGGCTC GGGACTGTCT TCAACCCTGC CCTGCACCTT GGGCACGGGA 4095
 GAGCGCCACC CGCCCGCCCC CGCCCTCGCT CCGGGTGCGT GACCGGCCCCG CCACCTTGTA 4155
 CAGAACCAGC ACTCCCAGGG CCCGAGCGCG TGCCTTCCCC GTGCGCAGCC GCGCTCTGCC 4215
 CCTCCGTCCC CAGGGTGCGAG GCGCGCACCG CCCAACCCCC ACCTCCCGGT GTATGCAGTG 4275
 GTGATGCCTA AAGGAATGTC ACG 4298

(2) INFORMATION FOR SEQ ID NO:2:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 938 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

Met Ser Thr Met Arg Leu Leu Thr Leu Ala Leu Leu Phe Ser Cys Ser
 1 5 10 15
 Val Ala Arg Ala Ala Cys Asp Pro Lys Ile Val Asn Ile Gly Ala Val
 20 25 30
 Leu Ser Thr Arg Lys His Glu Gln Met Phe Arg Glu Ala Val Asn Gln
 35 40 45
 Ala Asn Lys Arg His Gly Ser Trp Lys Ile Gln Leu Asn Ala Thr Ser
 50 55 60
 Val Thr His Lys Pro Asn Ala Ile Gln Met Ala Leu Ser Val Cys Glu
 65 70 75 80
 Asp Leu Ile Ser Ser Gln Val Tyr Ala Ile Leu Val Ser His Pro Pro
 85 90 95
 Thr Pro Asn Asp His Phe Thr Pro Thr Pro Val Ser Tyr Thr Ala Gly
 100 105 110
 Phe Tyr Arg Ile Pro Val Leu Gly Leu Thr Thr Arg Met Ser Ile Tyr
 115 120 125
 Ser Asp Lys Ser Ile His Leu Ser Phe Leu Arg Thr Val Pro Pro Tyr
 130 135 140
 Ser His Gln Ser Ser Val Trp Phe Glu Met Met Arg Val Tyr Ser Trp
 145 150 155 160
 Asn His Ile Ile Leu Leu Val Ser Asp Asp His Glu Gly Arg Ala Ala
 165 170 175
 Gln Lys Arg Leu Glu Thr Leu Leu Glu Glu Arg Glu Ser Lys Ala Glu
 180 185 190

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Lys Val Leu Gln Phe Asp Pro Gly Thr Lys Asn Val Thr Ala Leu Leu
 195 200 205
 Met Glu Ala Lys Glu Leu Glu Ala Arg Val Ile Ile Leu Ser Ala Ser
 210 215 220
 Glu Asp Asp Ala Ala Thr Val Tyr Arg Ala Ala Ala Met Leu Asn Met
 225 230 235 240
 GlyThr Gly Ser Gly Tyr Val Trp Leu Val Gly Glu Arg Glu Ile Ser
 245 250 255
 Asn Ala Leu Arg Tyr Ala Pro Asp Gly Ile Leu Gly Leu Gln Leu Ile
 260 265 270
 Asn Gly Lys Asn Glu Ser Ala His Ile Ser Asp Ala Val Gly Val Val
 275 280 285
 Ala Gln Ala Val His Glu Leu Leu Glu Lys Glu Asn Ile Thr Asp Pro
 290 295 300
 Pro Arg Gly Cys Val Gly Asn Thr Asn Ile Trp Lys Thr Gly Pro Leu
 305 310 315 320
 Phe Lys Arg Val Leu Met Ser Ser Lys Tyr Ala Asp Gly Val Thr Gly
 325 330 335
 Arg Val Glu Phe Asn Glu Asp Gly Asp Arg Lys Phe Ala Asn Tyr Ser
 340 345 350
 Ile Met Asn Leu Gln Asn Arg Lys Leu Val Gln Val Gly Ile Tyr Asn
 355 360 365
 Gly Thr His Val Ile Pro Asn Asp Arg Lys Ile Ile Trp Pro Gly Gly
 370 375 380
 Glu Thr Glu Lys Pro Arg Gly Tyr Gln Met Ser Thr Arg Leu Lys Ile
 385 390 395 400
 Val Thr Ile His Gln Glu Pro Phe Val Tyr Val Lys Pro Thr Leu Ser
 405 410 415
 Asp Gly Thr Cys Lys Glu Glu Phe Thr Val Asn Gly Asp Pro Val Lys
 420 425 430
 Lys Val Ile Cys Thr Gly Pro Asn Asp Thr Ser Pro Gly Ser Pro Arg
 435 440 445
 His Thr Val Pro Gln Cys Cys Tyr Gly Phe Cys Ile Asp Leu Leu Ile
 450 455 460
 Lys Leu Ala Arg Thr Met Asn Phe Thr Tyr Glu Val His Leu Val Ala
 465 470 475 480
 Asp Gly Lys Phe Gly Thr Gln Glu Arg Val Asn Asn Ser Asn Lys Lys
 485 490 495
 Glu Trp Asn Gly Met Met Gly Glu Leu Leu Ser Gly Gln Ala Asp Met
 500 505 510
 Ile Val Ala Pro Leu Thr Ile Asn Asn Glu Arg Ala Gln Tyr Ile Glu
 515 520 525
 Phe Ser Lys Pro Phe Lys Tyr Gln Gly Leu Thr Ile Leu Val Lys Lys
 530 535 540

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Glu Ile Pro Arg Ser Thr Leu Asp Ser Phe Met Gln Pro Phe Gln Ser
 545 550 555 560
 Thr Leu Trp Leu Leu Val Gly Leu Ser Val His Val Val Ala Val Met
 565 570 575
 Leu Tyr Leu Leu Asp Arg Phe Ser Pro Phe Gly Arg Phe Lys Val Asn
 580 585 590
 Ser Glu Glu Glu Glu Asp Ala Leu Thr Leu Ser Ser Ala Met Trp
 595 600 605
 Phe Ser Trp Gly Val Leu Leu Asn Ser Gly Ile Gly Glu Gly Ala Pro
 610 615 620
 Arg Ser Phe Ser Ala Arg Ile Leu Gly Met Val Trp Ala Gly Phe Ala
 625 630 635 640
 Met Ile Ile Val Ala Ser Tyr Thr Ala Asn Leu Ala Ala Phe Leu Val
 645 650 655
 Leu Asp Arg Pro Glu Glu Arg Ile Thr Gly Ile Asn Asp Pro Arg Leu
 660 665 670
 Arg Asn Pro Ser Asp Lys Phe Ile Tyr Ala Thr Val Lys Gln Ser Ser
 675 680 685
 Val Asp Ile Tyr Phe Arg Arg Gln Val Glu Leu Ser Thr Met Tyr Arg
 690 695 700
 His Met Glu Lys His Asn Tyr Glu Ser Ala Ala Glu Ala Ile Gln Ala
 705 710 715 720
 Val Arg Asp Asn Lys Leu His Ala Phe Ile Trp Asp Ser Ala Val Leu
 725 730 735
 Glu Phe Glu Ala Ser Gln Lys Cys Asp Leu Val Thr Thr Gly Glu Leu
 740 745 750
 Phe Phe Arg Ser Gly Phe Gly Ile Gly Met Arg Lys Asp Ser Pro Trp
 755 760 765
 Lys Gln Asn Val Ser Leu Ser Ile Leu Lys Ser His Glu Asn Gly Phe
 770 775 780
 Met Glu Asp Leu Asp Lys Thr Trp Val Arg Tyr Gln Glu Cys Asp Ser
 785 790 795 800
 Arg Ser Asn Ala Pro Ala Thr Leu Thr Phe Glu Asn Met Ala Gly Val
 805 810 815
 Phe Met Leu Val Ala Gly Gly Ile Val Ala Gly Ile Phe Leu Ile Phe
 820 825 830
 Ile Glu Ile Ala Tyr Lys Arg His Lys Asp Ala Arg Arg Lys Gln Met
 835 840 845
 Gln Leu Ala Phe Ala Ala Val Asn Val Trp Arg Lys Asn Leu Gln Asp
 850 855 860
 Arg Lys Ser Gly Arg Ala Glu Pro Asp Pro Lys Lys Lys Ala Thr Phe
 865 870 875 880
 Arg Ala Ile Thr Ser Thr Leu Ala Ser Ser Phe Lys Arg Arg Arg Ser
 885 890 895

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Ser Lys Asp Thr Ser Thr Gly Gly Gly Arg Gly Ala Leu Gln Asn Gln
 900 905 910

Lys Asp Thr Val Leu Pro Arg Arg Ala Ile Glu Arg Glu Glu Gly Gln
 915 920 925

Leu Gln Leu Cys Ser Arg His Arg Glu Ser
 930 935

(2) INFORMATION FOR SEQ ID NO:3:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 63 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: both
 (D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

- (ix) FEATURE:
 (A) NAME/KEY: CDS
 (B) LOCATION: 1..63

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

ACT AAA AAA AGG AAC TAT GAA AAC CTC GAC CAA CTG TCC TAT GAC AAC 48
 Ser Lys Lys Arg Asn Tyr Glu Asn Leu Asp Gln Leu Ser Tyr Asp Asn
 1 5 10 15

AAG CGC GGA CCC AAG 63
 Lys Arg Gly Pro Lys
 20

(2) INFORMATION FOR SEQ ID NO:4:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 21 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

Ser Lys Lys Arg Asn Tyr Glu Asn Leu Asp Gln Leu Ser Tyr Asp Asn
 1 5 10 15

Lys Arg Gly Pro Lys
 20

(2) INFORMATION FOR SEQ ID NO:5:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 4340 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: both
 (D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

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(ix) FEATURE:

(A) NAME/KEY: CDS

(B) LOCATION: 189..3899

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

| | |
|---|-----|
| CCCTTAATAA GATTTGCCAC GTACACTCGA GCCATCGCGA GTGTCCTTGA GCCGCGGGTG | 60 |
| ACGGTGGCTC TCGCTGCTCG CGCCCCCTCC TCCCGCGGGG GGAGCCTGAT GCCACGTTCC | 120 |
| CTATGAATTA TTTATCGCCG GCCTAAAAAT ACCCCGAACT TCACAGCCCG AGTGACCCTC | 180 |
| CGGTGGAC ATG GGT GGG GCC CTG GGG CCG GCC CTG TTG CTC ACC TCG CTC | 230 |
| Met Gly Gly Ala Leu Gly Pro Ala Leu Leu Thr Ser Leu | |
| 1 5 10 | |
| TTC GGT GCC TGG GCA GGG CTG GGT CCG GGG CAG GAG CAG GGC ATG | 278 |
| Phe Gly Ala Trp Ala Gly Leu Gly Pro Gly Gln Gly Glu Gln Gly Met | |
| 15 20 25 30 | |
| ACG GTG GCC GTG GTG TTT AGC AGC TCA GGG CCG CCC CAG GCC CAG TTC | 326 |
| Thr Val Ala Val Val Phe Ser Ser Ser Gly Pro Pro Gln Ala Gln Phe | |
| 35 40 45 | |
| CGT GTC CGC CTC ACC CCC CAG AGC TTC CTG GAC CTA CCC CTG GAG ATC | 374 |
| Arg Val Arg Leu Thr Pro Gln Ser Phe Leu Asp Leu Pro Leu Glu Ile | |
| 50 55 60 | |
| CAG CCG CTC ACA GTT GGG GTC AAC ACC ACC AAC CCC AGC AGC CTC CTC | 422 |
| Gln Pro Leu Thr Val Gly Val Asn Thr Thr Asn Pro Ser Ser Leu Leu | |
| 65 70 75 | |
| ACC CAG ATC TGC GGC CTC CTG GGT GCT GCC CAC GTC CAC GGC ATT GTC | 470 |
| Thr Gln Ile Cys Gly Leu Leu Gly Ala Ala His Val His Gly Ile Val | |
| 80 85 90 | |
| TTT GAG GAC AAC GTG GAC ACC GAG GCG GTG GCC CAG ATC CTT GAC TTC | 518 |
| Phe Glu Asp Asn Val Asp Thr Glu Ala Val Ala Gln Ile Leu Asp Phe | |
| 95 100 105 110 | |
| ATC TCC TCC CAG ACC CAT GTG CCC ATC CTC AGC ATC AGC GGA GGC TCT | 566 |
| Ile Ser Ser Gln Thr His Val Pro Ile Leu Ser Ile Ser Gly Gly Ser | |
| 115 120 125 | |
| GCT GTG GTC CTC ACC CCC AAG GAG CCG GGC TCC GCC TTC CTG CAG CTG | 614 |
| Ala Val Val Leu Thr Pro Lys Glu Pro Gly Ser Ala Phe Leu Gln Leu | |
| 130 135 140 | |
| GGC GTG TCC CTG GAG CAG CAG CTG CAG GTG CTG TTC AAG GTG CTG GAA | 662 |
| Gly Val Ser Leu Glu Gln Gln Leu Gln Val Leu Phe Lys Val Leu Glu | |
| 145 150 155 | |
| GAG TAC GAC TGG AGC GCC TTC GCC GTC ATC ACC AGC CTG CAC CCG GGC | 710 |
| Glu Tyr Asp Trp Ser Ala Phe Ala Val Ile Thr Ser Leu His Pro Gly | |
| 160 165 170 | |
| CAC GCG CTC TTC CTG GAG GGC GTG CCG GCC GTC GCC GAC GCC AGC CAC | 758 |
| His Ala Leu Phe Leu Glu Gly Val Arg Ala Val Ala Asp Ala Ser His | |
| 175 180 185 190 | |
| GTG AGT TGG CGG CTG CTG GAC GTG GTC ACG CTG GAA CTG GAC CCG GGA | 806 |
| Val Ser Trp Arg Leu Leu Asp Val Val Thr Leu Glu Leu Asp Pro Gly | |
| 195 200 205 | |

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| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| GGG | CCG | CGC | GCG | CGC | ACG | CAG | CGC | CTG | CTG | CGC | CAG | CTC | GAC | GCG | CCC | 854 |
| Gly | Pro | Arg | Ala | Arg | Thr | Gln | Arg | Leu | Leu | Arg | Gln | Leu | Asp | Ala | Pro | |
| | | | 210 | | | | | 215 | | | | | 220 | | | |
| GTG | TTT | GTG | GCC | TAC | TGC | TCG | CGC | GAG | GAG | GCC | GAG | GTG | CTC | TTC | GCC | 902 |
| Val | Phe | Val | Ala | Tyr | Cys | Ser | Arg | Glu | Glu | Ala | Glu | Val | Leu | Phe | Ala | |
| | | 225 | | | | | 230 | | | | | 235 | | | | |
| GAG | GCG | GCG | CAG | GCC | GGT | CTG | GTG | GGG | CCC | GGC | CAC | GTG | TGG | CTG | GTG | 950 |
| Glu | Ala | Ala | Gln | Ala | Gly | Leu | Val | Gly | Pro | Gly | His | Val | Trp | Leu | Val | |
| | 240 | | | | | 245 | | | | | 250 | | | | | |
| CCC | AAC | CTG | GCG | CTG | GGC | AGC | ACC | GAT | GCG | CCC | CCC | GCC | ACC | TTC | CCC | 998 |
| Pro | Asn | Leu | Ala | Leu | Gly | Ser | Thr | Asp | Ala | Pro | Pro | Ala | Thr | Phe | Pro | |
| 255 | | | | | 260 | | | | | 265 | | | | | 270 | |
| GTG | GGC | CTC | ATC | AGC | GTC | GTC | ACC | GAG | AGC | TGG | CGC | CTC | AGC | CTG | CGC | 1046 |
| Val | Gly | Leu | Ile | Ser | Val | Val | Thr | Glu | Ser | Trp | Arg | Leu | Ser | Leu | Arg | |
| | | | | 275 | | | | | 280 | | | | | 285 | | |
| CAG | AAG | GTG | CGC | GAC | GGC | GTG | GCC | ATT | CTG | GCC | CTG | GGC | GCC | CAC | AGC | 1094 |
| Gln | Lys | Val | Arg | Asp | Gly | Val | Ala | Ile | Leu | Ala | Leu | Gly | Ala | His | Ser | |
| | | | 290 | | | | | 295 | | | | | 300 | | | |
| TAC | TGG | CGC | CAG | CAT | GGA | ACC | CTG | CCA | GCC | CCG | GCC | GGG | GAC | TGC | CGT | 1142 |
| Tyr | Trp | Arg | Gln | His | Gly | Thr | Leu | Pro | Ala | Pro | Ala | Gly | Asp | Cys | Arg | |
| | | 305 | | | | | 310 | | | | | 315 | | | | |
| GTT | CAC | CCT | GGG | CCC | GTC | AGC | CCT | GCC | CGG | GAG | GCC | TTC | TAC | AGG | CAC | 1190 |
| Val | His | Pro | Gly | Pro | Val | Ser | Pro | Ala | Arg | Glu | Ala | Phe | Tyr | Arg | His | |
| | 320 | | | | | 325 | | | | | 330 | | | | | |
| CTA | CTG | AAT | GTC | ACC | TGG | GAG | GGC | CGA | GAC | TTC | TCC | TTC | AGC | CCT | GGT | 1238 |
| Leu | Leu | Asn | Val | Thr | Trp | Glu | Gly | Arg | Asp | Phe | Ser | Phe | Ser | Pro | Gly | |
| 335 | | | | | 340 | | | | 345 | | | | | | 350 | |
| GGG | TAC | CTG | GTC | CAG | CCC | ACC | ATG | GTG | GTG | ATC | GCC | CTC | AAC | CGG | CAC | 1286 |
| Gly | Tyr | Leu | Val | Gln | Pro | Thr | Met | Val | Val | Ile | Ala | Leu | Asn | Arg | His | |
| | | | | 355 | | | | 360 | | | | | | 365 | | |
| CGC | CTC | TGG | GAG | ATG | GTG | GGG | CGC | TGG | GAG | CAT | GGC | GTC | CTA | TAC | ATG | 1334 |
| Arg | Leu | Trp | Glu | Met | Val | Gly | Arg | Trp | Glu | His | Gly | Val | Leu | Tyr | Met | |
| | | | 370 | | | | | 375 | | | | | 380 | | | |
| AAG | TAC | CCC | GTG | TGG | CCT | CGC | TAC | AGT | GCC | TCT | CTG | CAG | CCT | GTG | GTG | 1382 |
| Lys | Tyr | Pro | Val | Trp | Pro | Arg | Tyr | Ser | Ala | Ser | Leu | Gln | Pro | Val | Val | |
| | | 385 | | | | | 390 | | | | | 395 | | | | |
| GAC | AGT | CGG | CAC | CTG | ACG | GTG | GCC | ACG | CTG | GAA | GAG | CGG | CCC | TTT | GTC | 1430 |
| Asp | Ser | Arg | His | Leu | Thr | Val | Ala | Thr | Leu | Glu | Glu | Arg | Pro | Phe | Val | |
| | 400 | | | | | 405 | | | | | 410 | | | | | |
| ATC | GTG | GAG | AGC | CCT | GAC | CCT | GGC | ACA | GGA | GGC | TGT | GTC | CCC | AAC | ACC | 1478 |
| Ile | Val | Glu | Ser | Pro | Asp | Pro | Gly | Thr | Gly | Gly | Cys | Val | Pro | Asn | Thr | |
| 415 | | | | | 420 | | | | | 425 | | | | | 430 | |
| GTG | CCC | TGC | CGC | AGG | CAG | AGC | AAC | CAC | ACC | TTC | AGC | AGC | GGG | GAC | GTG | 1526 |
| Val | Pro | Cys | Arg | Arg | Gln | Ser | Asn | His | Thr | Phe | Ser | Ser | Gly | Asp | Val | |
| | | | | 435 | | | | | 440 | | | | | 445 | | |
| GCC | CCC | TAC | ACC | AAG | CTC | TGC | TGT | AAG | GGA | TTC | TGC | ATC | GAC | ATC | CTC | 1574 |
| Ala | Pro | Tyr | Thr | Lys | Leu | Cys | Cys | Lys | Gly | Phe | Cys | Ile | Asp | Ile | Leu | |
| | | | 450 | | | | | 455 | | | | | 460 | | | |
| AAG | AAG | CTG | GCC | AGA | GTG | GTC | AAA | TTC | TCC | TAC | GAC | CTG | TAC | CTG | GTG | 1622 |
| Lys | Lys | Leu | Ala | Arg | Val | Val | Lys | Phe | Ser | Tyr | Asp | Leu | Tyr | Leu | Val | |
| | | 465 | | | | | 470 | | | | | 475 | | | | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| ACC | AAC | GGC | AAG | CAT | GGC | AAG | CGG | GTG | CGC | GGC | GTA | TGG | AAC | GGC | ATG | 1670 |
| Thr | Asn | Gly | Lys | His | Gly | Lys | Arg | Val | Arg | Gly | Val | Trp | Asn | Gly | Met | |
| | 480 | | | | | 485 | | | | | 490 | | | | | |
| ATT | GGG | GAG | GTG | TAC | TAC | AAG | CGG | GCA | GAC | ATG | GCC | ATC | GGC | TCC | CTC | 1718 |
| Ile | Gly | Glu | Val | Tyr | Tyr | Lys | Arg | Ala | Asp | Met | Ala | Ile | Gly | Ser | Leu | |
| 495 | | | | | 500 | | | | | 505 | | | | | 510 | |
| ACC | ATC | AAT | GAG | GAA | CGC | TCC | GAG | ATC | GTA | GAC | TTC | TCT | GTA | CCC | TTT | 1766 |
| Thr | Ile | Asn | Glu | Glu | Arg | Ser | Glu | Ile | Val | Asp | Phe | Ser | Val | Pro | Phe | |
| | | | | 515 | | | | | 520 | | | | | 525 | | |
| GTG | GAG | ACG | GGC | ATC | AGT | GTG | ATG | GTG | GCT | CGC | AGC | AAT | GGC | ACC | GTC | 1814 |
| Val | Glu | Thr | Gly | Ile | Ser | Val | Met | Val | Ala | Arg | Ser | Asn | Gly | Thr | Val | |
| | | | 530 | | | | | 535 | | | | | 540 | | | |
| TCC | CCC | TCG | GCC | TTC | TTG | GAG | CCA | TAT | AGC | CCT | GCA | GTG | TGG | GTG | ATG | 1862 |
| Ser | Pro | Ser | Ala | Phe | Leu | Glu | Pro | Tyr | Ser | Pro | Ala | Val | Trp | Val | Met | |
| | | 545 | | | | | 550 | | | | | 555 | | | | |
| ATG | TTT | GTC | ATG | TGC | CTC | ACT | GTG | GTG | GCC | ATC | ACC | GTC | TTC | ATG | TTC | 1910 |
| Met | Phe | Val | Met | Cys | Leu | Thr | Val | Val | Ala | Ile | Thr | Val | Phe | Met | Phe | |
| | 560 | | | | | 565 | | | | | 570 | | | | | |
| GAG | TAC | TTC | AGC | CCT | GTC | AGC | TAC | AAC | CAG | AAC | CTC | ACC | AGA | GGC | AAG | 1958 |
| Glu | Tyr | Phe | Ser | Pro | Val | Ser | Tyr | Asn | Gln | Asn | Leu | Thr | Arg | Gly | Lys | |
| 575 | | | | | 580 | | | | | 585 | | | | | 590 | |
| AAG | TCC | GGG | GGC | CCA | GCT | TTC | ACT | ATC | GGC | AAG | TCC | GTG | TGG | CTG | CTG | 2006 |
| Lys | Ser | Gly | Gly | Pro | Ala | Phe | Thr | Ile | Gly | Lys | Ser | Val | Trp | Leu | Leu | |
| | | | | 595 | | | | | 600 | | | | | 605 | | |
| TGG | GCG | CTG | GTC | TTC | AAC | AAC | TCA | GTG | CCC | ATC | GAG | AAC | CCG | CGG | GGC | 2054 |
| Trp | Ala | Leu | Val | Phe | Asn | Asn | Ser | Val | Pro | Ile | Glu | Asn | Pro | Arg | Gly | |
| | | | 610 | | | | | 615 | | | | | 620 | | | |
| ACC | ACC | AGC | AAG | ATC | ATG | GTT | CTG | GTC | TGG | GCC | TTC | TTT | GCT | GTC | ATC | 2102 |
| Thr | Thr | Ser | Lys | Ile | Met | Val | Leu | Val | Trp | Ala | Phe | Phe | Ala | Val | Ile | |
| | | 625 | | | | | 630 | | | | | 635 | | | | |
| TTC | CTC | GCC | AGA | TAC | ACG | GCC | AAC | CTG | GCC | GCC | TTC | ATG | ATC | CAA | GAG | 2150 |
| Phe | Leu | Ala | Arg | Tyr | Thr | Ala | Asn | Leu | Ala | Ala | Phe | Met | Ile | Gln | Glu | |
| | 640 | | | | | 645 | | | | | 650 | | | | | |
| CAA | TAC | ATC | GAC | ACT | GTG | TCG | GGC | CTC | AGT | GAC | AAG | AAG | TTT | CAG | CGG | 2198 |
| Gln | Tyr | Ile | Asp | Thr | Val | Ser | Gly | Leu | Ser | Asp | Lys | Lys | Phe | Gln | Arg | |
| 655 | | | | | 660 | | | | | 665 | | | | | 670 | |
| CCT | CAA | GAT | CAG | TAC | CCA | CCT | TTC | CGC | TTC | GGC | ACG | GTG | CCC | AAC | GGC | 2246 |
| Pro | Gln | Asp | Gln | Tyr | Pro | Pro | Phe | Arg | Phe | Gly | Thr | Val | Pro | Asn | Gly | |
| | | | | 675 | | | | | 680 | | | | | 685 | | |
| AGC | ACG | GAG | CGG | AAC | ATC | CGC | AGT | AAC | TAC | CGT | GAC | ATG | CAC | ACC | CAC | 2294 |
| Ser | Thr | Glu | Arg | Asn | Ile | Arg | Ser | Asn | Tyr | Arg | Asp | Met | His | Thr | His | |
| | | | 690 | | | | | 695 | | | | | 700 | | | |
| ATG | GTC | AAG | TTC | AAC | CAG | CGC | TCG | GTG | GAG | GAC | GCG | CTC | ACC | AGC | CTC | 2342 |
| Met | Val | Lys | Phe | Asn | Gln | Arg | Ser | Val | Glu | Asp | Ala | Leu | Thr | Ser | Leu | |
| | | 705 | | | | | 710 | | | | | 715 | | | | |
| AAG | ATG | GGG | AAG | CTG | GAT | GCC | TTC | ATC | TAT | GAT | GCT | GCT | GTC | CTC | AAC | 2390 |
| Lys | Met | Gly | Lys | Leu | Asp | Ala | Phe | Ile | Tyr | Asp | Ala | Ala | Val | Leu | Asn | |
| | 720 | | | | | 725 | | | | | 730 | | | | | |
| TAC | ATG | GCA | GGC | AAG | GAC | GAG | GGC | TGC | AAG | CTG | GTC | ACC | ATT | GGG | TCT | 2438 |
| Tyr | Met | Ala | Gly | Lys | Asp | Glu | Gly | Cys | Lys | Leu | Val | Thr | Ile | Gly | Ser | |
| 735 | | | | | 740 | | | | | 745 | | | | | 750 | |

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|------|-----|-----|-----|-----|------|------|-----|-----|-----|------|------|-----|------|
| GGC | AAG | GTC | TTT | GCT | ACC | ACT | GGC | TAC | GGC | ATC | GCC | ATG | CAG | AAG | GAC | 2486 |
| Gly | Lys | Val | Phe | Ala | Thr | Thr | Gly | Tyr | Gly | Ile | Ala | Met | Gln | Lys | Asp | |
| | | | | 755 | | | | | 760 | | | | | 765 | | |
| TCC | CAC | TGG | AAG | CGG | GCC | ATA | GAC | CTG | GCG | CTC | TTG | CAG | TTC | CTG | GGG | 2534 |
| Ser | His | Trp | Lys | Arg | Ala | Ile | Asp | Leu | Ala | Leu | Leu | Gln | Phe | Leu | Gly | |
| | | | 770 | | | | | 775 | | | | | 780 | | | |
| GAC | GGA | GAG | ACA | CAG | AAA | CTG | GAG | ACA | GTG | TGG | CTC | TCA | GGG | ATC | TGC | 2582 |
| Asp | Gly | Glu | Thr | Gln | Lys | Leu | Glu | Thr | Val | Trp | Leu | Ser | Gly | Ile | Cys | |
| | | 785 | | | | | 790 | | | | | 795 | | | | |
| CAG | AAT | GAG | AAG | AAC | GAG | GTG | ATG | AGC | AGC | AAG | CTG | GAC | ATC | GAC | AAC | 2630 |
| Gln | Asn | Glu | Lys | Asn | Glu | Val | Met | Ser | Ser | Lys | Leu | Asp | Ile | Asp | Asn | |
| | 800 | | | | | 805 | | | | | 810 | | | | | |
| ATG | GCA | GGC | GTC | TTC | TAC | ATG | CTG | CTG | GTG | GCC | ATG | GGG | CTG | GCC | CTG | 2678 |
| Met | Ala | Gly | Val | Phe | Tyr | Met | Leu | Leu | Val | Ala | Met | Gly | Leu | Ala | Leu | |
| 815 | | | | | 820 | | | | | 825 | | | | | 830 | |
| CTG | GTC | TTC | GCC | TGG | GAG | CAC | CTG | GTC | TAC | TGG | AAG | CTG | CGC | CAC | TCG | 2726 |
| Leu | Val | Phe | Ala | Trp | Glu | His | Leu | Val | Tyr | Trp | Lys | Leu | Arg | His | Ser | |
| | | | | 835 | | | | | 840 | | | | | 845 | | |
| GTG | CCC | AAC | TCA | TCC | CAG | CTG | GAC | TTC | CTG | CTG | GCT | TTC | AGC | AGG | GGC | 2774 |
| Val | Pro | Asn | Ser | Ser | Gln | Leu | Asp | Phe | Leu | Leu | Ala | Phe | Ser | Arg | Gly | |
| | | | 850 | | | | | 855 | | | | | 860 | | | |
| ATC | TAC | AGC | TGC | TTC | AGC | GGG | GTG | CAG | AGC | CTC | GCC | AGC | CCA | CCG | CGG | 2822 |
| Ile | Tyr | Ser | Cys | Phe | Ser | Gly | Val | Gln | Ser | Leu | Ala | Ser | Pro | Pro | Arg | |
| | | 865 | | | | | 870 | | | | | 875 | | | | |
| CAG | GCC | AGC | CCG | GAC | CTC | ACG | GCC | AGC | TCG | GCC | CAG | GCC | AGC | GTG | CTC | 2870 |
| Gln | Ala | Ser | Pro | Asp | Leu | Thr | Ala | Ser | Ser | Ala | Gln | Ala | Ser | Val | Leu | |
| | 880 | | | | | 885 | | | | | 890 | | | | | |
| AAG | ATG | CTG | CAG | GCA | GCC | CGC | GAC | ATG | GTG | ACC | ACG | GCG | GGC | GTA | AGC | 2918 |
| Lys | Met | Leu | Gln | Ala | Ala | Arg | Asp | Met | Val | Thr | Thr | Ala | Gly | Val | Ser | |
| 895 | | | | | 900 | | | | | 905 | | | | | 910 | |
| AGC | TCC | CTG | GAC | CGC | GCC | ACT | CGC | ACC | ATC | GAG | AAT | TGG | GGT | GGC | GGC | 2966 |
| Ser | Ser | Leu | Asp | Arg | Ala | Thr | Arg | Thr | Ile | Glu | Asn | Trp | Gly | Gly | Gly | |
| | | | | 915 | | | | | 920 | | | | | 925 | | |
| CGC | CGT | GCG | CCC | CCA | CCG | TCC | CCC | TGC | CCG | ACC | CCG | CGG | TCT | GGC | CCC | 3014 |
| Arg | Arg | Ala | Pro | Pro | Pro | Ser | Pro | Cys | Pro | Thr | Pro | Arg | Ser | Gly | Pro | |
| | | | 930 | | | | | 935 | | | | | 940 | | | |
| AGC | CCA | TGC | CTG | CCC | ACC | CCC | GAC | CCG | CCC | CCA | GAG | CCG | AGC | CCC | ACG | 3062 |
| Ser | Pro | Cys | Leu | Pro | Thr | Pro | Asp | Pro | Pro | Pro | Glu | Pro | Ser | Pro | Thr | |
| | | 945 | | | | | 950 | | | | | 955 | | | | |
| GGC | TGG | GGA | CCG | CCA | GAC | GGG | GGT | CGC | GCG | GCG | CTT | GTG | CGC | AGG | GCT | 3110 |
| Gly | Trp | Gly | Pro | Pro | Asp | Gly | Gly | Arg | Ala | Ala | Leu | Val | Arg | Arg | Ala | |
| | 960 | | | | | 965 | | | | | 970 | | | | | |
| CCG | CAG | CCC | CCG | GGC | CGC | CCC | CCG | ACG | CCG | GGG | CCG | CCC | CTG | TCC | GAC | 3158 |
| Pro | Gln | Pro | Pro | Gly | Arg | Pro | Pro | Thr | Pro | Gly | Pro | Pro | Leu | Ser | Asp | |
| | 975 | | | | 980 | | | | | 985 | | | | | 990 | |
| GTC | TCC | CGA | GTG | TCG | CGC | CGC | CCA | GCC | TGG | GAG | GCG | CGG | TGG | CCG | GTG | 3206 |
| Val | Ser | Arg | Val | Ser | Arg | Arg | Pro | Ala | Trp | Glu | Ala | Arg | Trp | Pro | Val | |
| | | | 995 | | | | | | 1000 | | | | | 1005 | | |
| CGG | ACC | GGG | CAC | TGC | GGG | AGG | CAC | CTC | TCG | GCC | TCC | GAG | CGG | CCC | CTG | 3254 |
| Arg | Thr | Gly | His | Cys | Gly | Arg | His | Leu | Ser | Ala | Ser | Glu | Arg | Pro | Leu | |
| | | | 1010 | | | | | 1015 | | | | | 1020 | | | |

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|---|------|
| TCG CCC GCG CGC TGT CAC TAC AGC TCC TTT CCT CGA GCC GAC CGA TCC | 3302 |
| Ser Pro Ala Arg Cys His Tyr Ser Ser Phe Pro Arg Ala Asp Arg Ser | |
| 1025 1030 1035 | |
| GGC CGC CCC TTC CTC CCG CTC TTC CCG GAG CCC CCG GAG CTG GAG GAC | 3350 |
| Gly Arg Pro Phe Leu Pro Leu Phe Pro Glu Pro Pro Glu Leu Glu Asp | |
| 1040 1045 1050 | |
| CTG CCG CTG CTC GGT CCG GAG CAG CTG GCC CGG CGG GAG GCC CTG CTG | 3398 |
| Leu Pro Leu Leu Gly Pro Glu Gln Leu Ala Arg Arg Glu Ala Leu Leu | |
| 1055 1060 1065 1070 | |
| CAC GCG GCC TGG GCC CGG GGC TCG CGC CCG CGT CAC GCT TCC CTG CCC | 3446 |
| His Ala Ala Trp Ala Arg Gly Ser Arg Pro Arg His Ala Ser Leu Pro | |
| 1075 1080 1085 | |
| AGC TCC GTG GCC GAG GCC TTC GCT CGG CCC AGC TCG CTG CCC GCT GGG | 3494 |
| Ser Ser Val Ala Glu Ala Phe Ala Arg Pro Ser Ser Leu Pro Ala Gly | |
| 1090 1095 1100 | |
| TGC ACC GGC CCC GCC TGC GCC CGC CCC GAC GGA CAC TCG GCC TGC AGG | 3542 |
| Cys Thr Gly Pro Ala Cys Ala Arg Pro Asp Gly His Ser Ala Cys Arg | |
| 1105 1110 1115 | |
| CGC TTG GCG CAG GCG CAG TCG ATG TGC TTG CCG ATC TAC CGG GAG GCC | 3590 |
| Arg Leu Ala Gln Ala Gln Ser Met Cys Leu Pro Ile Tyr Arg Glu Ala | |
| 1120 1125 1130 | |
| TGC CAG GAG GGC GAG CAG GCA GGG GCC CCC GCC TGG CAG CAC AGA CAG | 3638 |
| Cys Gln Glu Gly Glu Gln Ala Gly Ala Pro Ala Trp Gln His Arg Gln | |
| 1135 1140 1145 1150 | |
| CAC GTC TGC CTG CAC GCC CAC GCC CAC CTG CCA TTT TGC TGG GGG GCT | 3686 |
| His Val Cys Leu His Ala His Ala His Leu Pro Phe Cys Trp Gly Ala | |
| 1155 1160 1165 | |
| GTC TGT CCT CAC CTT CCA CCC TGT GCC AGC CAC GGC TCC TGG CTC TCC | 3734 |
| Val Cys Pro His Leu Pro Pro Cys Ala Ser His Gly Ser Trp Leu Ser | |
| 1170 1175 1180 | |
| GGG GCC TGG GGG CCT CTG GGG CAC AGG GGC AGG ACT CTG GGG CTG GGC | 3782 |
| Gly Ala Trp Gly Pro Leu Gly His Arg Gly Arg Thr Leu Gly Leu Gly | |
| 1185 1190 1195 | |
| ACA GGC TAC AGA GAC AGT GGG GGA CTG GAC GAG ATC AGC AGG GTA GCC | 3830 |
| Thr Gly Tyr Arg Asp Ser Gly Gly Leu Asp Glu Ile Ser Arg Val Ala | |
| 1200 1205 1210 | |
| CGT GGG ACG CAA GGC TTC CCG GGA CCC TGC ACC TGG AGA CGG ATC TCC | 3878 |
| Arg Gly Thr Gln Gly Phe Pro Gly Pro Cys Thr Trp Arg Arg Ile Ser | |
| 1215 1220 1225 1230 | |
| AGT CTG GAG TCA GAA GTG TGAGTTATCA GCCACTCAGG CTCCGAGCCA | 3926 |
| Ser Leu Glu Ser Glu Val | |
| 1235 | |
| GCTGGATTCT CTGCCTGCCA CTGTCAGGGT TAAGCGGCAG GCAGGATTGG GCTTTTCTGG | 3986 |
| CTTCTACCAT GAAATCCTGG CCATGGGACC CCAGTGACAG ATGATGTCTT CCATGGTCAT | 4046 |
| CAGTGACCTC AGTAGCCTCA AATCATGGTG AGGGCTGGGC TTTTGCTGTC CTCTTCTCAC | 4106 |
| GCAGAGTTCT GCCAGGAGGG TGTGCTGTGG GGGTCAGACT CCTGAGGCTC TCCCTTCCCT | 4166 |
| GGGGCTAGCC AGTTACTGGT CATGCCTGCT GTGGGCATGG AGGCTGGAAC TTGTGGTTGA | 4226 |

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GGCAGGGCCA TCCCGATCCT TGCTCTACCT GGCTAGAGTT TCTTCTCATC AGAGCACTGG 4286
 GACATTAAAC CCACCTTTTC CCAGAAAAAA AAAAAAAAAA AAAAAAAAAA AAAG 4340

(2) INFORMATION FOR SEQ ID NO:6:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 1236 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

Met Gly Gly Ala Leu Gly Pro Ala Leu Leu Leu Thr Ser Leu Phe Gly
 1 5 10 15
 Ala Trp Ala Gly Leu Gly Pro Gly Gln Gly Glu Gln Gly Met Thr Val
 20 25 30
 Ala Val Val Phe Ser Ser Ser Gly Pro Pro Gln Ala Gln Phe Arg Val
 35 40 45
 Arg Leu Thr Pro Gln Ser Phe Leu Asp Leu Pro Leu Glu Ile Gln Pro
 50 55 60
 Leu Thr Val Gly Val Asn Thr Thr Asn Pro Ser Ser Leu Leu Thr Gln
 65 70 75 80
 Ile Cys Gly Leu Leu Gly Ala Ala His Val His Gly Ile Val Phe Glu
 85 90 95
 Asp Asn Val Asp Thr Glu Ala Val Ala Gln Ile Leu Asp Phe Ile Ser
 100 105 110
 Ser Gln Thr His Val Pro Ile Leu Ser Ile Ser Gly Gly Ser Ala Val
 115 120 125
 Val Leu Thr Pro Lys Glu Pro Gly Ser Ala Phe Leu Gln Leu Gly Val
 130 135 140
 Ser Leu Glu Gln Gln Leu Gln Val Leu Phe Lys Val Leu Glu Glu Tyr
 145 150 155 160
 Asp Trp Ser Ala Phe Ala Val Ile Thr Ser Leu His Pro Gly His Ala
 165 170 175
 Leu Phe Leu Glu Gly Val Arg Ala Val Ala Asp Ala Ser His Val Ser
 180 185 190
 Trp Arg Leu Leu Asp Val Val Thr Leu Glu Leu Asp Pro Gly Gly Pro
 195 200 205
 Arg Ala Arg Thr Gln Arg Leu Leu Arg Gln Leu Asp Ala Pro Val Phe
 210 215 220
 Val Ala Tyr Cys Ser Arg Glu Glu Ala Glu Val Leu Phe Ala Glu Ala
 225 230 235 240
 Ala Gln Ala Gly Leu Val Gly Pro Gly His Val Trp Leu Val Pro Asn
 245 250 255
 Leu Ala Leu Gly Ser Thr Asp Ala Pro Pro Ala Thr Phe Pro Val Gly
 260 265 270

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Leu Ile Ser Val Val Thr Glu Ser Trp Arg Leu Ser Leu Arg Gln Lys
 275 280 285
 Val Arg Asp Gly Val Ala Ile Leu Ala Leu Gly Ala His Ser Tyr Trp
 290 295 300
 Arg Gln His Gly Thr Leu Pro Ala Pro Ala Gly Asp Cys Arg Val His
 305 310 315 320
 Pro Gly Pro Val Ser Pro Ala Arg Glu Ala Phe Tyr Arg His Leu Leu
 325 330 335
 Asn Val Thr Trp Glu Gly Arg Asp Phe Ser Phe Ser Pro Gly Gly Tyr
 340 345 350
 Leu Val Gln Pro Thr Met Val Val Ile Ala Leu Asn Arg His Arg Leu
 355 360 365
 Trp Glu Met Val Gly Arg Trp Glu His Gly Val Leu Tyr Met Lys Tyr
 370 375 380
 Pro Val Trp Pro Arg Tyr Ser Ala Ser Leu Gln Pro Val Val Asp Ser
 385 390 395 400
 Arg His Leu Thr Val Ala Thr Leu Glu Glu Arg Pro Phe Val Ile Val
 405 410 415
 Glu Ser Pro Asp Pro Gly Thr Gly Gly Cys Val Pro Asn Thr Val Pro
 420 425 430
 Cys Arg Arg Gln Ser Asn His Thr Phe Ser Ser Gly Asp Val Ala Pro
 435 440 445
 Tyr Thr Lys Leu Cys Cys Lys Gly Phe Cys Ile Asp Ile Leu Lys Lys
 450 455 460
 Leu Ala Arg Val Val Lys Phe Ser Tyr Asp Leu Tyr Leu Val Thr Asn
 465 470 475 480
 Gly Lys His Gly Lys Arg Val Arg Gly Val Trp Asn Gly Met Ile Gly
 485 490 495
 Glu Val Tyr Tyr Lys Arg Ala Asp Met Ala Ile Gly Ser Leu Thr Ile
 500 505 510
 Asn Glu Glu Arg Ser Glu Ile Val Asp Phe Ser Val Pro Phe Val Glu
 515 520 525
 Thr Gly Ile Ser Val Met Val Ala Arg Ser Asn Gly Thr Val Ser Pro
 530 535 540
 Ser Ala Phe Leu Glu Pro Tyr Ser Pro Ala Val Trp Val Met Met Phe
 545 550 555 560
 Val Met Cys Leu Thr Val Val Ala Ile Thr Val Phe Met Phe Glu Tyr
 565 570 575
 Phe Ser Pro Val Ser Tyr Asn Gln Asn Leu Thr Arg Gly Lys Lys Ser
 580 585 590
 Gly Gly Pro Ala Phe Thr Ile Gly Lys Ser Val Trp Leu Leu Trp Ala
 595 600 605
 Leu Val Phe Asn Asn Ser Val Pro Ile Glu Asn Pro Arg Gly Thr Thr
 610 615 620

Ser Lys Ile Met Val Leu Val Trp Ala Phe Phe Ala Val Ile Phe Leu
 625 630 635 640
 Ala Arg Tyr Thr Ala Asn Leu Ala Ala Phe Met Ile Gln Glu Gln Tyr
 645 650 655
 Ile Asp Thr Val Ser Gly Leu Ser Asp Lys Lys Phe Gln Arg Pro Gln
 660 665 670
 Asp Gln Tyr Pro Pro Phe Arg Phe Gly Thr Val Pro Asn Gly Ser Thr
 675 680 685
 Glu Arg Asn Ile Arg Ser Asn Tyr Arg Asp Met His Thr His Met Val
 690 695 700
 Lys Phe Asn Gln Arg Ser Val Glu Asp Ala Leu Thr Ser Leu Lys Met
 705 710 715 720
 Gly Lys Leu Asp Ala Phe Ile Tyr Asp Ala Val Leu Asn Tyr Met
 725 730 735
 Ala Gly Lys Asp Glu Gly Cys Lys Leu Val Thr Ile Gly Ser Gly Lys
 740 745 750
 Val Phe Ala Thr Thr Gly Tyr Gly Ile Ala Met Gln Lys Asp Ser His
 755 760 765
 Trp Lys Arg Ala Ile Asp Leu Ala Leu Leu Gln Phe Leu Gly Asp Gly
 770 775 780
 Glu Thr Gln Lys Leu Glu Thr Val Trp Leu Ser Gly Ile Cys Gln Asn
 785 790 795 800
 Glu Lys Asn Glu Val Met Ser Ser Lys Leu Asp Ile Asp Asn Met Ala
 805 810 815
 Gly Val Phe Tyr Met Leu Leu Val Ala Met Gly Leu Ala Leu Leu Val
 820 825 830
 Phe Ala Trp Glu His Leu Val Tyr Trp Lys Leu Arg His Ser Val Pro
 835 840 845
 Asn Ser Ser Gln Leu Asp Phe Leu Leu Ala Phe Ser Arg Gly Ile Tyr
 850 855 860
 Ser Cys Phe Ser Gly Val Gln Ser Leu Ala Ser Pro Pro Arg Gln Ala
 865 870 875 880
 Ser Pro Asp Leu Thr Ala Ser Ser Ala Gln Ala Ser Val Leu Lys Met
 885 890 895
 Leu Gln Ala Ala Arg Asp Met Val Thr Thr Ala Gly Val Ser Ser Ser
 900 905 910
 Leu Asp Arg Ala Thr Arg Thr Ile Glu Asn Trp Gly Gly Gly Arg Arg
 915 920 925
 Ala Pro Pro Pro Ser Pro Cys Pro Thr Pro Arg Ser Gly Pro Ser Pro
 930 935 940
 Cys Leu Pro Thr Pro Asp Pro Pro Pro Glu Pro Ser Pro Thr Gly Trp
 945 950 955 960
 Gly Pro Pro Asp Gly Gly Arg Ala Ala Leu Val Arg Arg Ala Pro Gln
 965 970 975

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Pro Pro Gly Arg Pro Pro Thr Pro Gly Pro Pro Leu Ser Asp Val Ser
 980 985 990
 Arg Val Ser Arg Arg Pro Ala Trp Glu Ala Arg Trp Pro Val Arg Thr
 995 1000 1005
 Gly His Cys Gly Arg His Leu Ser Ala Ser Glu Arg Pro Leu Ser Pro
 1010 1015 1020
 Ala Arg Cys His Tyr Ser Ser Phe Pro Arg Ala Asp Arg Ser Gly Arg
 1025 1030 1035 1040
 Pro Phe Leu Pro Leu Phe Pro Glu Pro Pro Glu Leu Glu Asp Leu Pro
 1045 1050 1055
 Leu Leu Gly Pro Glu Gln Leu Ala Arg Arg Glu Ala Leu Leu His Ala
 1060 1065 1070
 Ala Trp Ala Arg Gly Ser Arg Pro Arg His Ala Ser Leu Pro Ser Ser
 1075 1080 1085
 Val Ala Glu Ala Phe Ala Arg Pro Ser Ser Leu Pro Ala Gly Cys Thr
 1090 1095 1100
 Gly Pro Ala Cys Ala Arg Pro Asp Gly His Ser Ala Cys Arg Arg Leu
 1105 1110 1115 1120
 Ala Gln Ala Gln Ser Met Cys Leu Pro Ile Tyr Arg Glu Ala Cys Gln
 1125 1130 1135
 Glu Gly Glu Gln Ala Gly Ala Pro Ala Trp Gln His Arg Gln His Val
 1140 1145 1150
 Cys Leu His Ala His Ala His Leu Pro Phe Cys Trp Gly Ala Val Cys
 1155 1160 1165
 Pro His Leu Pro Pro Cys Ala Ser His Gly Ser Trp Leu Ser Gly Ala
 1170 1175 1180
 Trp Gly Pro Leu Gly His Arg Gly Arg Thr Leu Gly Leu Gly Thr Gly
 1185 1190 1195 1200
 Tyr Arg Asp Ser Gly Gly Leu Asp Glu Ile Ser Arg Val Ala Arg Gly
 1205 1210 1215
 Thr Gln Gly Phe Pro Gly Pro Cys Thr Trp Arg Arg Ile Ser Ser Leu
 1220 1225 1230
 Glu Ser Glu Val
 1235

(2) INFORMATION FOR SEQ ID NO:7:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 24 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: both
- (D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 2..22

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

C TCT GAG GCT CAG CCT GTC CCC AG
 Ser Glu Ala Gln Pro Val Pro
 1 5

24

(2) INFORMATION FOR SEQ ID NO:8:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 7 amino acids
 (B) TYPE: amino acid
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

Ser Glu Ala Gln Pro Val Pro
 1 5

(2) INFORMATION FOR SEQ ID NO:9:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 11 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: unknown
 (D) TOPOLOGY: unknown

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

AGAAGGGGGT G

11

(2) INFORMATION FOR SEQ ID NO:10:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 4808 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: both
 (D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
 (B) LOCATION: 311..4705

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

| | |
|---|-----|
| ATCATGGGAC CGGGTGAGCG CTGAGAATCG CGGCCGACG CATCAGCCCT GGAGATGACC | 60 |
| AGGAGCGGCC ACTGCTGAGA ACTATGTGGA GAGAGGCTGC GAGCCCTGCT GCAGAGCCTC | 120 |
| CGGCTGGGAT AGCCGCCCCC CGTGGGGGCG ATGCGGACAG CGCGGGACAG CCAGGGGAGC | 180 |
| GCGCTGGGGC CGCAGCATGC GGAACCCGC TAAACCCGGT GGCTGCTGAG GCGGCCGAGA | 240 |
| TGCTCGTGCG CGCAGCGCGC CCCACTGCAT CCTCGACCTT CTCGGGCTAC AGGGACCGTC | 300 |

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| | | | | | | | | | | | | | | | |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|------|
| AGTGGCGACT | ATG | GGC | AGA | GTG | GGC | TAT | TGG | ACC | CTG | CTG | GTG | CTG | CCG | | 349 |
| | Met | Gly | Arg | Val | Gly | Tyr | Trp | Thr | Leu | Leu | Val | Leu | Pro | | |
| | 1 | | | | 5 | | | | | 10 | | | | | |
| GCC CTT CTG GTC TGG CGC GGT CCG GCG CCG AGC GCG GCG GCG GAG AAG | | | | | | | | | | | | | | | 397 |
| Ala Leu Leu Val Trp Arg Gly Pro Ala Pro Ser Ala Ala Ala Glu Lys | | | | | | | | | | | | | | | |
| | 15 | | | | | 20 | | | | 25 | | | | | |
| GGT CCC CCC GCG CTA AAT ATT GCG GTG ATG CTG GGT CAC AGC CAC GAC | | | | | | | | | | | | | | | 445 |
| Gly Pro Pro Ala Leu Asn Ile Ala Val Met Leu Gly His Ser His Asp | | | | | | 35 | | | | 40 | | | | | 45 |
| | 30 | | | | | | | | | | | | | | |
| GTG ACA GAG CGC GAA CTT CGA ACA CTG TGG GGC CCC GAG CAG GCG GCG | | | | | | | | | | | | | | | 493 |
| Val Thr Glu Arg Glu Leu Arg Thr Leu Trp Gly Pro Glu Gln Ala Ala | | | | | | 50 | | | | 55 | | | | 60 | |
| | | | | | | | | | | | | | | | |
| GGG CTG CCC CTG GAC GTG AAC GTG GTA GCT CTG CTG ATG AAC CGC ACC | | | | | | | | | | | | | | | 541 |
| Gly Leu Pro Leu Asp Val Asn Val Val Ala Leu Leu Met Asn Arg Thr | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| GAC CCC AAG AGC CTC ATC ACG CAC GTG TGC GAC CTC ATG TCC GGG GCA | | | | | | | | | | | | | | | 589 |
| Asp Pro Lys Ser Leu Ile Thr His Val Cys Asp Leu Met Ser Gly Ala | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| CGC ATC CAC GGC CTC GTG TTT GGG GAC GAC ACG GAC CAG GAG GCC GTA | | | | | | | | | | | | | | | 637 |
| Arg Ile His Gly Leu Val Phe Gly Asp Asp Thr Asp Gln Glu Ala Val | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| GCC CAG ATG CTG GAT TTT ATC TCC TCC CAC ACC TTC GTC CCC ATC TTG | | | | | | | | | | | | | | | 685 |
| Ala Gln Met Leu Asp Phe Ile Ser Ser His Thr Phe Val Pro Ile Leu | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| GGC ATT CAT GGG GGC GCA TCT ATG ATC ATG GCT GAC AAG GAT CCG ACG | | | | | | | | | | | | | | | 733 |
| Gly Ile His Gly Gly Ala Ser Met Ile Met Ala Asp Lys Asp Pro Thr | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| TCT ACC TTC TTC CAG TTT GGA GCG TCC ATC CAG CAG CAA GCC ACG GTC | | | | | | | | | | | | | | | 781 |
| Ser Thr Phe Phe Gln Phe Gly Ala Ser Ile Gln Gln Gln Ala Thr Val | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| ATG CTG AAG ATC ATG CAG GAT TAT GAC TGG CAT GTC TTC TCC CTG GTG | | | | | | | | | | | | | | | 829 |
| Met Leu Lys Ile Met Gln Asp Tyr Asp Trp His Val Phe Ser Leu Val | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| ACC ACT ATC TTC CCT GGC TAC AGG GAA TTC ATC AGC TTC GTC AAG ACC | | | | | | | | | | | | | | | 877 |
| Thr Thr Ile Phe Pro Gly Tyr Arg Glu Phe Ile Ser Phe Val Lys Thr | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| ACA GTG GAC AAC AGC TTT GTG GGC TGG GAC ATG CAG AAT GTG ATC ACA | | | | | | | | | | | | | | | 925 |
| Thr Val Asp Asn Ser Phe Val Gly Trp Asp Met Gln Asn Val Ile Thr | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| CTG GAC ACT TCC TTT GAG GAT GCA AAG ACA CAA GTC CAG CTG AAG AAG | | | | | | | | | | | | | | | 973 |
| Leu Asp Thr Ser Phe Glu Asp Ala Lys Thr Gln Val Gln Leu Lys Lys | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| ATC CAC TCT TCT GTC ATC TTG CTC TAC TGT TCC AAA GAC GAG GCT GTT | | | | | | | | | | | | | | | 1021 |
| Ile His Ser Ser Val Ile Leu Leu Tyr Cys Ser Lys Asp Glu Ala Val | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| CTC ATT CTG AGT GAG GCC CGC TCC CTT GGC CTC ACC GGG TAT GAT TTC | | | | | | | | | | | | | | | 1069 |
| Leu Ile Leu Ser Glu Ala Arg Ser Leu Gly Leu Thr Gly Tyr Asp Phe | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| TTC TGG ATT GTC CCC AGC TTG GTC TCT GGG AAC ACG GAG CTC ATC CCA | | | | | | | | | | | | | | | 1117 |
| Phe Trp Ile Val Pro Ser Leu Val Ser Gly Asn Thr Glu Leu Ile Pro | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

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|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------|
| AAA Lys 270 | GAG Glu | TTT Phe | CCA Pro | TCG Ser | GGA Gly 275 | CTC Leu | ATT Ile | TCT Ser | GTC Val | TCC Ser 280 | TAC Tyr | GAT Asp | GAC Asp | TGG Trp | GAC Asp 285 | 1165 |
| TAC Tyr | AGC Ser | CTG Leu | GAG Glu | CGG Ala 290 | AGA Arg | GTG Val | AGG Arg | GAC Asp | GGC Gly 295 | ATT Ile | GGC Gly | ATC Ile | CTA Leu | ACC Thr 300 | ACC Thr | 1213 |
| GCT Ala | GCA Ala | TCT Ser | TCT Ser 305 | ATG Met | CTG Leu | GAG Glu | AAG Lys | TTC Phe 310 | TCC Ser | TAC Tyr | ATC Ile | CCC Pro | GAG Glu 315 | GCC Ala | AAG Lys | 1261 |
| GCC Ala | AGC Ser | TGC Cys 320 | TAC Tyr | GGG Gly | CAG Gln | ATG Met | GAG Glu 325 | AGG Arg | CCA Pro | GAG Glu | GTC Val | CCG Pro 330 | ATG Met | CAC His | ACC Thr | 1309 |
| TTG Leu | CAC His 335 | CCA Pro | TTT Phe | ATG Met | GTC Val | AAT Asn 340 | GTT Val | ACA Thr | TGG Trp | GAT Asp | GGC Gly 345 | AAA Lys | GAC Asp | TTA Leu | TCC Ser | 1357 |
| TTC Phe 350 | ACT Thr | GAG Glu | GAA Glu | GGC Gly 355 | TAC Tyr | CAG Gln | GTG Val | CAC His | CCC Pro | AGG Arg 360 | CTG Leu | GTG Val | GTG Val | ATT Ile | GTG Val 365 | 1405 |
| CTG Leu | AAC Asn | AAA Lys | GAC Asp | CGG Arg 370 | GAA Glu | TGG Trp | GAA Glu | AAG Lys | GTG Val 375 | GGC Gly | AAG Lys | TGG Trp | GAG Glu | AAC Asn 380 | CAT His | 1453 |
| ACG Thr | CTG Leu | AGC Ser | CTG Leu 385 | AGG Arg | CAC His | GCC Ala | GTG Val | TGG Trp 390 | CCC Pro | AGG Arg | TAC Tyr | AAG Lys | TCC Ser 395 | TTC Phe | TCC Ser | 1501 |
| GAC Asp | TGT Cys | GAG Glu 400 | CCG Pro | GAT Asp | GAC Asp | AAC Asn | CAT His 405 | CTC Leu | AGC Ser | ATC Ile | GTC Val | ACC Thr 410 | CTG Leu | GAG Glu | GAG Glu | 1549 |
| GCC Ala 415 | CCA Pro | TTC Phe | GTC Val | ATC Ile | GTG Val | GAA Glu 420 | GAC Asp | ATA Ile | GAC Asp | CCC Pro | CTG Leu 425 | ACC Thr | GAG Glu | ACG Thr | TGT Cys | 1597 |
| GTG Val 430 | AGG Arg | AAC Asn | ACC Thr | GTG Val | CCA Pro 435 | TGT Cys | CGG Arg | AAG Lys | TTC Phe | GTC Val 440 | AAA Lys | ATC Ile | AAC Asn | AAT Asn | TCA Ser 445 | 1645 |
| ACC Thr | AAT Asn | GAG Glu | GGG Gly 450 | ATG Met | AAT Asn | GTG Val | AAG Lys | AAA Lys | TGC Cys 455 | TGC Cys | AAG Lys | GGG Gly | TTC Phe | TGC Cys 460 | ATT Ile | 1693 |
| GAT Asp | ATT Ile | CTG Leu | AAG Lys 465 | AAG Lys | CTT Leu | TCC Ser | AGA Arg | ACT Thr 470 | GTG Val | AAG Lys | TTT Phe | ACT Thr 475 | TAC Tyr | GAC Asp | CTC Leu | 1741 |
| TAT Tyr | CTG Leu | GTG Val 480 | ACC Thr | AAT Asn | GGG Gly | AAG Lys | CAT His 485 | GGC Gly | AAG Lys | AAA Lys | GTT Val | AAC Asn 490 | AAT Asn | GTG Val | TGG Trp | 1789 |
| AAT Asn 495 | GGA Gly | ATG Met | ATC Ile | GGT Gly | GAA Glu 500 | GTG Val | GTC Val | TAT Tyr | CAA Gln | CGG Arg | GCA Ala 505 | GTC Val | ATG Met | GCA Ala | GTT Val | 1837 |
| GGC Gly 510 | TCG Ser | CTC Leu | ACC Thr | ATC Ile | AAT Asn 515 | GAG Glu | GAA Glu | CGT Arg | TCT Ser | GAA Glu 520 | GTG Val | GTG Val | GAC Asp | TTC Phe | TCT Ser 525 | 1885 |
| GTG Val | CCC Pro | TTT Phe | GTG Val | GAA Glu 530 | ACG Thr | GGA Gly | ATC Ile | AGT Ser | GTC Val 535 | ATG Met | GTT Val | TCA Ser | AGA Arg | AGT Ser | AAT Asn 540 | 1933 |

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| GGC | ACC | GTC | TCA | CCT | TCT | GCT | TTT | CTA | GAA | CCA | TTC | AGC | GCC | TCT | GTC | 1981 |
| Gly | Thr | Val | Ser | Pro | Ser | Ala | Phe | Leu | Glu | Pro | Phe | Ser | Ala | Ser | Val | |
| | | | 545 | | | | | 550 | | | | | 555 | | | |
| TGG | GTG | ATG | ATG | TTT | GTG | ATG | CTG | CTC | ATT | GTT | TCT | GCC | ATA | GCT | GTT | 2029 |
| Trp | Val | Met | Met | Phe | Val | Met | Leu | Leu | Ile | Val | Ser | Ala | Ile | Ala | Val | |
| | | | 560 | | | | 565 | | | | | 570 | | | | |
| TGG | GTC | TTG | GAT | TAC | TCC | AGC | CCT | GTT | GGA | TAC | AAC | AGA | AAC | TTA | GCC | 2077 |
| Trp | Val | Leu | Asp | Tyr | Ser | Ser | Pro | Val | Gly | Tyr | Asn | Arg | Asn | Leu | Ala | |
| | | | 575 | | | 580 | | | | | 585 | | | | | |
| AAA | GGG | AAA | GCA | CCC | CAT | GGG | CCT | TCT | TTT | ACA | ATT | GGA | AAA | GCT | ATA | 2125 |
| Lys | Gly | Lys | Ala | Pro | His | Gly | Pro | Ser | Phe | Thr | Ile | Gly | Lys | Ala | Ile | |
| 590 | | | | | 595 | | | | | 600 | | | | | 605 | |
| TGG | CTT | CTT | TGG | GGC | CTG | GTG | TTC | AAT | AAC | TCC | GTG | CCT | GTC | CAG | AAT | 2173 |
| Trp | Leu | Leu | Trp | Gly | Leu | Val | Phe | Asn | Asn | Ser | Val | Pro | Val | Gln | Asn | |
| | | | | 610 | | | | | 615 | | | | | 620 | | |
| CCT | AAA | GGG | ACC | ACC | AGC | AAG | ATC | ATG | GTA | TCT | GTA | TGG | GCC | TTC | TTC | 2221 |
| Pro | Lys | Gly | Thr | Thr | Ser | Lys | Ile | Met | Val | Ser | Val | Trp | Ala | Phe | Phe | |
| | | | 625 | | | | | 630 | | | | | 635 | | | |
| GCT | GTC | ATA | TTC | CTG | GCT | AGC | TAC | ACA | GCC | AAT | CTG | GCT | GCC | TTC | ATG | 2269 |
| Ala | Val | Ile | Phe | Leu | Ala | Ser | Tyr | Thr | Ala | Asn | Leu | Ala | Ala | Phe | Met | |
| | | | 640 | | | | 645 | | | | | 650 | | | | |
| ATC | CAA | GAG | GAA | TTT | GTG | GAC | CAA | GTG | ACC | GGC | CTC | AGT | GAC | AAA | AAG | 2317 |
| Ile | Gln | Glu | Glu | Phe | Val | Asp | Gln | Val | Thr | Gly | Leu | Ser | Asp | Lys | Lys | |
| | | | 655 | | | 660 | | | | | 665 | | | | | |
| TTT | CAG | AGA | CCT | CAT | GAC | TAT | TCC | CCA | CCT | TTT | CGA | TTT | GGG | ACA | GTG | 2365 |
| Phe | Gln | Arg | Pro | His | Asp | Tyr | Ser | Pro | Pro | Phe | Arg | Phe | Gly | Thr | Val | |
| 670 | | | | | 675 | | | | | 680 | | | | | 685 | |
| CCT | AAT | GGA | AGC | ACG | GAG | AGA | AAC | ATT | CGG | AAT | AAC | TAT | CCC | TAC | ATG | 2413 |
| Pro | Asn | Gly | Ser | Thr | Glu | Arg | Asn | Ile | Arg | Asn | Asn | Tyr | Pro | Tyr | Met | |
| | | | | 690 | | | | | 695 | | | | | 700 | | |
| CAT | CAG | TAC | ATG | ACC | AAA | TTT | AAT | CAG | AAA | GGA | GTA | GAG | GAC | GCC | TTG | 2461 |
| His | Gln | Tyr | Met | Thr | Lys | Phe | Asn | Gln | Lys | Gly | Val | Glu | Asp | Ala | Leu | |
| | | | 705 | | | | 710 | | | | | | 715 | | | |
| GTC | AGC | CTG | AAA | ACG | GGG | AAG | CTG | GAC | GCT | TTC | ATC | TAC | GAT | GCC | GCA | 2509 |
| Val | Ser | Leu | Lys | Thr | Gly | Lys | Leu | Asp | Ala | Phe | Ile | Tyr | Asp | Ala | Ala | |
| | | | 720 | | | | 725 | | | | | 730 | | | | |
| GTC | TTG | AAT | TAC | AAG | GCT | GGG | AGG | GAT | GAA | GGC | TGC | AAG | CTG | GTG | ACC | 2557 |
| Val | Leu | Asn | Tyr | Lys | Ala | Gly | Arg | Asp | Glu | Gly | Cys | Lys | Leu | Val | Thr | |
| | | | 735 | | | 740 | | | | | 745 | | | | | |
| ATC | GGG | AGT | GGG | TAC | ATC | TTT | GCC | ACC | ACC | GGT | TAT | GGA | ATT | GCC | CTT | 2605 |
| Ile | Gly | Ser | Gly | Tyr | Ile | Phe | Ala | Thr | Thr | Gly | Tyr | Gly | Ile | Ala | Leu | |
| 750 | | | | | 755 | | | | | 760 | | | | | 765 | |
| CAG | AAA | GGC | TCT | CCT | TGG | AAG | AGG | CAG | ATC | GAC | CTG | GCC | TTG | CTT | CAG | 2653 |
| Gln | Lys | Gly | Ser | Pro | Trp | Lys | Arg | Gln | Ile | Asp | Leu | Ala | Leu | Leu | Gln | |
| | | | | 770 | | | | | 775 | | | | | 780 | | |
| TTT | GTG | GGT | GAT | GGT | GAG | ATG | GAG | GAG | CTG | GAG | ACC | CTG | TGG | CTC | ACT | 2701 |
| Phe | Val | Gly | Asp | Gly | Glu | Met | Glu | Glu | Leu | Glu | Thr | Leu | Trp | Leu | Thr | |
| | | | 785 | | | | | 790 | | | | | 795 | | | |
| GGG | ATC | TGC | CAC | AAC | GAG | AAG | AAC | GAG | GTG | ATG | AGC | AGC | CAG | CTG | GAC | 2749 |
| Gly | Ile | Cys | His | Asn | Glu | Lys | Asn | Glu | Val | Met | Ser | Ser | Gln | Leu | Asp | |
| | | | 800 | | | | 805 | | | | | | 810 | | | |

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| | | | | | | | | | | | | | | | | |
|------|-----|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|
| ATT | GAC | AAC | ATG | GCG | GGC | GTA | TTC | TAC | ATG | CTG | GCT | GCC | GCC | ATG | GCC | 2797 |
| Ile | Asp | Asn | Met | Ala | Gly | Val | Phe | Tyr | Met | Leu | Ala | Ala | Ala | Met | Ala | |
| 815 | | | | | | 820 | | | | | 825 | | | | | |
| CTT | AGC | CTC | ATC | ACC | TTC | ATC | TGG | GAG | CAC | CTC | TTC | TAC | TGG | AAG | CTG | 2845 |
| Leu | Ser | Leu | Ile | Thr | Phe | Ile | Trp | Glu | His | Leu | Phe | Tyr | Trp | Lys | Leu | |
| 830 | | | | | 835 | | | | | 840 | | | | | 845 | |
| CGC | TTC | TGT | TTC | ACG | GGC | GTG | TGC | TCC | GAC | CGG | CCT | GGG | TTG | CTC | TTC | 2893 |
| Arg | Phe | Cys | Phe | Thr | Gly | Val | Cys | Ser | Asp | Arg | Pro | Gly | Leu | Leu | Phe | |
| | | | | 850 | | | | | 855 | | | | | 860 | | |
| TCC | ATC | AGC | AGG | GGC | ATC | TAC | AGC | TGC | ATT | CAT | GGA | GTG | CAC | ATT | GAA | 2941 |
| Ser | Ile | Ser | Arg | Gly | Ile | Tyr | Ser | Cys | Ile | His | Gly | Val | His | Ile | Glu | |
| | | | 865 | | | | | 870 | | | | | 875 | | | |
| GAA | AAG | AAG | AAG | TCT | CCA | GAC | TTC | AAT | CTG | ACG | GGA | TCC | CAG | AGC | AAC | 2989 |
| Glu | Lys | Lys | Lys | Ser | Pro | Asp | Phe | Asn | Leu | Thr | Gly | Ser | Gln | Ser | Asn | |
| | | 880 | | | | 885 | | | | | | 890 | | | | |
| ATG | TTA | AAA | CTC | CTC | CGG | TCA | GCC | AAA | AAC | ATT | TCC | AGC | ATG | TCC | AAC | 3037 |
| Met | Leu | Lys | Leu | Leu | Arg | Ser | Ala | Lys | Asn | Ile | Ser | Ser | Met | Ser | Asn | |
| | 895 | | | | | 900 | | | | | 905 | | | | | |
| ATG | AAC | TCC | TCA | AGA | ATG | GAC | TCA | CCC | AAA | AGA | GCT | GCT | GAC | TTC | ATC | 3085 |
| Met | Asn | Ser | Ser | Arg | Met | Asp | Ser | Pro | Lys | Arg | Ala | Ala | Asp | Phe | Ile | |
| 910 | | | | | 915 | | | | | 920 | | | | | 925 | |
| CAA | AGA | GGT | TCC | CTC | ATC | ATG | GAC | ATG | GTT | TCA | GAT | AAG | GGG | AAT | TTG | 3133 |
| Gln | Arg | Gly | Ser | Leu | Ile | Met | Asp | Met | Val | Ser | Asp | Lys | Gly | Asn | Leu | |
| | | | | 930 | | | | | 935 | | | | | 940 | | |
| ATG | TAC | TCA | GAC | AAC | AGG | TCC | TTT | CAG | GGG | AAA | GAG | AGC | ATT | TTT | GGA | 3181 |
| Met | Tyr | Ser | Asp | Asn | Arg | Ser | Phe | Gln | Gly | Lys | Glu | Ser | Ile | Phe | Gly | |
| | | | 945 | | | | | 950 | | | | | 955 | | | |
| GAC | AAC | ATG | AAC | GAA | CTC | CAA | ACA | TTT | GTG | GCC | AAC | CGG | CAG | AAG | GAT | 3229 |
| Asp | Asn | Met | Asn | Glu | Leu | Gln | Thr | Phe | Val | Ala | Asn | Arg | Gln | Lys | Asp | |
| | | 960 | | | | 965 | | | | | | 970 | | | | |
| AAC | CTC | AAT | AAC | TAT | GTA | TTC | CAG | GGA | CAA | CAT | CCT | CTT | ACT | CTC | AAT | 3277 |
| Asn | Leu | Asn | Asn | Tyr | Val | Phe | Gln | Gly | Gln | His | Pro | Leu | Thr | Leu | Asn | |
| | 975 | | | | | 980 | | | | | 985 | | | | | |
| GAG | TCC | AAC | CCT | AAC | ACG | GTG | GAG | GTG | GCC | GTG | AGC | ACA | GAA | TCC | AAA | 3325 |
| Glu | Ser | Asn | Pro | Asn | Thr | Val | Glu | Val | Ala | Val | Ser | Thr | Glu | Ser | Lys | |
| 990 | | | | | 995 | | | | 1000 | | | | | | 1005 | |
| GCG | AAC | TCT | AGA | CCC | CGG | CAG | CTG | TGG | AAG | AAA | TCC | GTG | GAT | TCC | ATA | 3373 |
| Ala | Asn | Ser | Arg | Pro | Arg | Gln | Leu | Trp | Lys | Lys | Ser | Val | Asp | Ser | Ile | |
| | | | | 1010 | | | | | 1015 | | | | | 1020 | | |
| CGC | CAG | GAT | TCA | CTA | TCC | CAG | AAT | CCA | GTC | TCC | CAG | AGG | GAT | GAG | GCA | 3421 |
| Arg | Gln | Asp | Ser | Leu | Ser | Gln | Asn | Pro | Val | Ser | Gln | Arg | Asp | Glu | Ala | |
| | | | 1025 | | | | | 1030 | | | | | 1035 | | | |
| ACA | GCA | GAG | AAT | AGG | ACC | CAC | TCC | CTA | AAG | AGC | CCT | AGG | TAT | CTT | CCA | 3469 |
| Thr | Ala | Glu | Asn | Arg | Thr | His | Ser | Leu | Lys | Ser | Pro | Arg | Tyr | Leu | Pro | |
| | | 1040 | | | | | 1045 | | | | | 1050 | | | | |
| GAA | GAG | ATG | GCC | CAC | TCT | GAC | ATT | TCA | GAA | ACG | TCA | AAT | CGG | GCC | ACG | 3517 |
| Glu | Glu | Met | Ala | His | Ser | Asp | Ile | Ser | Glu | Thr | Ser | Asn | Arg | Ala | Thr | |
| | | 1055 | | | | 1060 | | | | | 1065 | | | | | |
| TGC | CAC | AGG | GAA | CCT | GAC | AAC | AGT | AAG | AAC | CAC | AAA | ACC | AAG | GAC | AAC | 3565 |
| Cys | His | Arg | Glu | Pro | Asp | Asn | Ser | Lys | Asn | His | Lys | Thr | Lys | Asp | Asn | |
| 1070 | | | | | | 1075 | | | | 1080 | | | | | 1085 | |

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| | |
|---|------|
| TTT AAA AGG TCA GTG GCC TCC AAA TAC CCC AAG GAC TGT AGT GAG GTC Phe Lys Arg Ser Val Ala Ser Lys Tyr Pro Lys Asp Cys Ser Glu Val 1090 1095 1100 | 3613 |
| GAG CGC ACC TAC CTG AAA ACC AAA TCA AGC TCC CCT AGA GAC AAG ATC Glu Arg Thr Tyr Leu Lys Thr Lys Ser Ser Ser Pro Arg Asp Lys Ile 1105 1110 1115 | 3661 |
| TAC ACT ATA GAT GGT GAG AAG GAG CCT GGT TTC CAC TTA GAT CCA CCC Tyr Thr Ile Asp Gly Glu Lys Glu Pro Gly Phe His Leu Asp Pro Pro 1120 1125 1130 | 3709 |
| CAG TTT GTT GAA AAT GTG ACC CTG CCC GAG AAC GTG GAC TTC CCG GAC Gln Phe Val Glu Asn Val Thr Leu Pro Glu Asn Val Asp Phe Pro Asp 1135 1140 1145 | 3757 |
| CCC TAC CAG GAT CCC AGT GAA AAC TTC CGC AAG GGG GAC TCC ACG CTG Pro Tyr Gln Asp Pro Ser Glu Asn Phe Arg Lys Gly Asp Ser Thr Leu 1150 1155 1160 1165 | 3805 |
| CCA ATG AAC CGG AAC CCC TTG CAT AAT GAA GAG GGG CTT TCC AAC AAC Pro Met Asn Arg Asn Pro Leu His Asn Glu Glu Gly Leu Ser Asn Asn 1170 1175 1180 | 3853 |
| GAC CAG TAT AAA CTC TAC TCC AAG CAC TTC ACC TTG AAA GAC AAG GGT Asp Gln Tyr Lys Leu Tyr Ser Lys His Phe Thr Leu Lys Asp Lys Gly 1185 1190 1195 | 3901 |
| TCC CCG CAC AGT GAG ACC AGC GAG CGA TAC CGG CAG AAC TCC ACG CAC Ser Pro His Ser Glu Thr Ser Glu Arg Tyr Arg Gln Asn Ser Thr His 1200 1205 1210 | 3949 |
| TGC AGA AGC TGC CTT TCC AAC ATG CCC ACC TAT TCA GGC CAC TTC ACC Cys Arg Ser Cys Leu Ser Asn Met Pro Thr Tyr Ser Gly His Phe Thr 1215 1220 1225 | 3997 |
| ATG AGG TCC CCC TTC AAG TGC GAT GCC TGC CTG CGG ATG GGG AAC CTC Met Arg Ser Pro Phe Lys Cys Asp Ala Cys Leu Arg Met Gly Asn Leu 1230 1235 1240 1245 | 4045 |
| TAT GAC ATC GAT GAA GAC CAG ATG CTT CAG GAG ACA GGT AAC CCA GCC Tyr Asp Ile Asp Glu Asp Gln Met Leu Gln Glu Thr Gly Asn Pro Ala 1250 1255 1260 | 4093 |
| ACC GGG GAG CAG GTC TAC CAG CAG GAC TGG GCA CAG AAC AAT GCC CTT Thr Gly Glu Gln Val Tyr Gln Gln Asp Trp Ala Gln Asn Asn Ala Leu 1265 1270 1275 | 4141 |
| CAA TTA CAA AAG AAC AAG CTA AGG ATT AGC CGT CAG CAT TCC TAC GAT Gln Leu Gln Lys Asn Lys Leu Arg Ile Ser Arg Gln His Ser Tyr Asp 1280 1285 1290 | 4189 |
| AAC ATT GTC GAC AAA CCT AGG GAG CTA GAC CTT AGC AGG CCC TCC CGG Asn Ile Val Asp Lys Pro Arg Glu Leu Asp Leu Ser Arg Pro Ser Arg 1295 1300 1305 | 4237 |
| AGC ATA AGC CTC AAG GAC AGG GAA CGG CTT CTG GAG GGA AAT TTT TAC Ser Ile Ser Leu Lys Asp Arg Glu Arg Leu Leu Glu Gly Asn Phe Tyr 1310 1315 1320 1325 | 4285 |
| GGC AGC CTG TTT AGT GTC CCC TCA AGC AAA CTC TCG GGG AAA AAA AGC Gly Ser Leu Phe Ser Val Pro Ser Ser Lys Leu Ser Gly Lys Lys Ser 1330 1335 1340 | 4333 |
| TCC CTT TTC CCC CAA GGT CTG GAG GAC AGC AAG AGG AGC AAG TCT CTC Ser Leu Phe Pro Gln Gly Leu Glu Asp Ser Lys Arg Ser Lys Ser Leu 1345 1350 1355 | 4381 |

T0202T 440001

TTG CCA GAC CAC ACC TCC GAT AAC CCT TTC CTC CAC TCC CAC AGG GAT 4429
 Leu Pro Asp His Thr Ser Asp Asn Pro Phe Leu His Ser His Arg Asp
 1360 1365 1370

GAC CAA CGC TTG GTT ATT GGG AGA TGC CCC TCG GAC CCT TAC AAA CAC 4477
 Asp Gln Arg Leu Val Ile Gly Arg Cys Pro Ser Asp Pro Tyr Lys His
 1375 1380 1385

TCG TTG CCA TCC CAG GCG GTG AAT GAC AGC TAT CTT CGG TCG TCC TTG 4525
 Ser Leu Pro Ser Gln Ala Val Asn Asp Ser Tyr Leu Arg Ser Ser Leu
 1390 1395 1400 1405

AGG TCA ACG GCA TCG TAC TGT TCC AGG GAC AGT CGG GGC CAC AAT GAT 4573
 Arg Ser Thr Ala Ser Tyr Cys Ser Arg Asp Ser Arg Gly His Asn Asp
 1410 1415 1420

GTG TAT ATT TCG GAG CAT GTT ATG CCT TAT GCT GCA AAT AAG AAT AAT 4621
 Val Tyr Ile Ser Glu His Val Met Pro Tyr Ala Ala Asn Lys Asn Asn
 1425 1430 1435

ATG TAC TCT ACC CCC AGG GTT TTA AAT TCC TGC AGC AAT AGA CGC GTG 4669
 Met Tyr Ser Thr Pro Arg Val Leu Asn Ser Cys Ser Asn Arg Arg Val
 1440 1445 1450

TAC AAG GAA ATG CCT AGT ATC GAA TCT GAT GTT TAAAAATCTT CCATTAATGT 4722
 Tyr Lys Glu Met Pro Ser Ile Glu Ser Asp Val 146

TTTATCTATA GGGAAATACA CGTAATGGCC AATGTTCTGG AGGGTAAATG TTGGATGTCC 4782
 AATAGTGCCC TGCTAAGAGG AAGGAG 4808

(2) INFORMATION FOR SEQ ID NO:11:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 1464 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

Met Gly Arg Val Gly Tyr Trp Thr Leu Leu Val Leu Pro Ala Leu Leu
 1 5 10 15

Val Trp Arg Gly Pro Ala Pro Ser Ala Ala Ala Glu Lys Gly Pro Pro
 20 25 30

Ala Leu Asn Ile Ala Val Met Leu Gly His Ser His Asp Val Thr Glu
 35 40 45

Arg Glu Leu Arg Thr Leu Trp Gly Pro Glu Gln Ala Ala Gly Leu Pro
 50 55 60

Leu Asp Val Asn Val Val Ala Leu Leu Met Asn Arg Thr Asp Pro Lys
 65 70 75 80

Ser Leu Ile Thr His Val Cys Asp Leu Met Ser Gly Ala Arg Ile His
 85 90 95

Gly Leu Val Phe Gly Asp Asp Thr Asp Gln Glu Ala Val Ala Gln Met
 100 105 110

Leu Asp Phe Ile Ser Ser His Thr Phe Val Pro Ile Leu Gly Ile His
 115 120 125

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| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Gly | Gly | Ala | Ser | Met | Ile | Met | Ala | Asp | Lys | Asp | Pro | Thr | Ser | Thr | Phe | |
| 130 | | | | | | 135 | | | | | 140 | | | | | |
| Phe | Gln | Phe | Gly | Ala | Ser | Ile | Gln | Gln | Gln | Ala | Thr | Val | Met | Leu | Lys | |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 | |
| Ile | Met | Gln | Asp | Tyr | Asp | Trp | His | Val | Phe | Ser | Leu | Val | Thr | Thr | Ile | |
| | | | | 165 | | | | | 170 | | | | | 175 | | |
| Phe | Pro | Gly | Tyr | Arg | Glu | Phe | Ile | Ser | Phe | Val | Lys | Thr | Thr | Val | Asp | |
| | | | 180 | | | | | 185 | | | | | 190 | | | |
| Asn | Ser | Phe | Val | Gly | Trp | Asp | Met | Gln | Asn | Val | Ile | Thr | Leu | Asp | Thr | |
| | | 195 | | | | | 200 | | | | | 205 | | | | |
| Ser | Phe | Glu | Asp | Ala | Lys | Thr | Gln | Val | Gln | Leu | Lys | Lys | Ile | His | Ser | |
| 210 | | | | | | 215 | | | | | 220 | | | | | |
| Ser | Val | Ile | Leu | Leu | Tyr | Cys | Ser | Lys | Asp | Glu | Ala | Val | Leu | Ile | Leu | |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 | |
| Ser | Glu | Ala | Arg | Ser | Leu | Gly | Leu | Thr | Gly | Tyr | Asp | Phe | Phe | Trp | Ile | |
| | | | | 245 | | | | | 250 | | | | | 255 | | |
| Val | Pro | Ser | Leu | Val | Ser | Gly | Asn | Thr | Glu | Leu | Ile | Pro | Lys | Glu | Phe | |
| | | | 260 | | | | | 265 | | | | | 270 | | | |
| Pro | Ser | Gly | Leu | Ile | Ser | Val | Ser | Tyr | Asp | Asp | Trp | Asp | Tyr | Ser | Leu | |
| | | 275 | | | | | 280 | | | | | | 285 | | | |
| Glu | Ala | Arg | Val | Arg | Asp | Gly | Ile | Gly | Ile | Leu | Thr | Thr | Ala | Ala | Ser | |
| 290 | | | | | | 295 | | | | | 300 | | | | | |
| Ser | Met | Leu | Glu | Lys | Phe | Ser | Tyr | Ile | Pro | Glu | Ala | Lys | Ala | Ser | Cys | |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 | |
| Tyr | Gly | Gln | Met | Glu | Arg | Pro | Glu | Val | Pro | Met | His | Thr | Leu | His | Pro | |
| | | | | 325 | | | | | 330 | | | | | 335 | | |
| Phe | Met | Val | Asn | Val | Thr | Trp | Asp | Gly | Lys | Asp | Leu | Ser | Phe | Thr | Glu | |
| | | | 340 | | | | | 345 | | | | | 350 | | | |
| Glu | Gly | Tyr | Gln | Val | His | Pro | Arg | Leu | Val | Val | Ile | Val | Leu | Asn | Lys | |
| | | 355 | | | | | 360 | | | | | 365 | | | | |
| Asp | Arg | Glu | Trp | Glu | Lys | Val | Gly | Lys | Trp | Glu | Asn | His | Thr | Leu | Ser | |
| | | 370 | | | | 375 | | | | | 380 | | | | | |
| Leu | Arg | His | Ala | Val | Trp | Pro | Arg | Tyr | Lys | Ser | Phe | Ser | Asp | Cys | Glu | |
| 385 | | | | | 390 | | | | | 395 | | | | | 400 | |
| Pro | Asp | Asp | Asn | His | Leu | Ser | Ile | Val | Thr | Leu | Glu | Glu | Ala | Pro | Phe | |
| | | | | 405 | | | | | 410 | | | | | 415 | | |
| Val | Ile | Val | Glu | Asp | Ile | Asp | Pro | Leu | Thr | Glu | Thr | Cys | Val | Arg | Asn | |
| | | | 420 | | | | | 425 | | | | | 430 | | | |
| Thr | Val | Pro | Cys | Arg | Lys | Phe | Val | Lys | Ile | Asn | Asn | Ser | Thr | Asn | Glu | |
| | | 435 | | | | | 440 | | | | | 445 | | | | |
| Gly | Met | Asn | Val | Lys | Lys | Cys | Cys | Lys | Gly | Phe | Cys | Ile | Asp | Ile | Leu | |
| 450 | | | | | | 455 | | | | | 460 | | | | | |
| Lys | Lys | Leu | Ser | Arg | Thr | Val | Lys | Phe | Thr | Tyr | Asp | Leu | Tyr | Leu | Val | |
| 465 | | | | | 470 | | | | | 475 | | | | | 480 | |

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Thr Asn Gly Lys His Gly Lys Lys Val Asn Asn Val Trp Asn Gly Met
 485 490 495
 Ile Gly Glu Val Val Tyr Gln Arg Ala Val Met Ala Val Gly Ser Leu
 500 505 510
 Thr Ile Asn Glu Glu Arg Ser Glu Val Val Asp Phe Ser Val Pro Phe
 515 520 525
 Val Glu Thr Gly Ile Ser Val Met Val Ser Arg Ser Asn Gly Thr Val
 530 535 540
 Ser Pro Ser Ala Phe Leu Glu Pro Phe Ser Ala Ser Val Trp Val Met
 545 550 555 560
 Met Phe Val Met Leu Leu Ile Val Ser Ala Ile Ala Val Trp Val Leu
 565 570 575
 Asp Tyr Ser Ser Pro Val Gly Tyr Asn Arg Asn Leu Ala Lys Gly Lys
 580 585 590
 Ala Pro His Gly Pro Ser Phe Thr Ile Gly Lys Ala Ile Trp Leu Leu
 595 600 605
 Trp Gly Leu Val Phe Asn Asn Ser Val Pro Val Gln Asn Pro Lys Gly
 610 615 620
 Thr Thr Ser Lys Ile Met Val Ser Val Trp Ala Phe Phe Ala Val Ile
 625 630 635 640
 Phe Leu Ala Ser Tyr Thr Ala Asn Leu Ala Ala Phe Met Ile Gln Glu
 645 650 655
 Glu Phe Val Asp Gln Val Thr Gly Leu Ser Asp Lys Lys Phe Gln Arg
 660 665 670
 Pro His Asp Tyr Ser Pro Pro Phe Arg Phe Gly Thr Val Pro Asn Gly
 675 680 685
 Ser Thr Glu Arg Asn Ile Arg Asn Asn Tyr Pro Tyr Met His Gln Tyr
 690 695 700
 Met Thr Lys Phe Asn Gln Lys Gly Val Glu Asp Ala Leu Val Ser Leu
 705 710 715 720
 Lys Thr Gly Lys Leu Asp Ala Phe Ile Tyr Asp Ala Ala Val Leu Asn
 725 730 735
 Tyr Lys Ala Gly Arg Asp Glu Gly Cys Lys Leu Val Thr Ile Gly Ser
 740 745 750
 Gly Tyr Ile Phe Ala Thr Thr Gly Tyr Gly Ile Ala Leu Gln Lys Gly
 755 760 765
 Ser Pro Trp Lys Arg Gln Ile Asp Leu Ala Leu Leu Gln Phe Val Gly
 770 775 780
 Asp Gly Glu Met Glu Glu Leu Glu Thr Leu Trp Leu Thr Gly Ile Cys
 785 790 795 800
 His Asn Glu Lys Asn Glu Val Met Ser Ser Gln Leu Asp Ile Asp Asn
 805 810 815
 Met Ala Gly Val Phe Tyr Met Leu Ala Ala Ala Met Ala Leu Ser Leu
 820 825 830

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Ile Thr Phe Ile Trp Glu His Leu Phe Tyr Trp Lys Leu Arg Phe Cys
 835 840 845
 Phe Thr Gly Val Cys Ser Asp Arg Pro Gly Leu Leu Phe Ser Ile Ser
 850 855 860
 Arg Gly Ile Tyr Ser Cys Ile His Gly Val His Ile Glu Glu Lys Lys
 865 870 875 880
 Lys Ser Pro Asp Phe Asn Leu Thr Gly Ser Gln Ser Asn Met Leu Lys
 885 890 895
 Leu Leu Arg Ser Ala Lys Asn Ile Ser Ser Met Ser Asn Met Asn Ser
 900 905 910
 Ser Arg Met Asp Ser Pro Lys Arg Ala Ala Asp Phe Ile Gln Arg Gly
 915 920 925
 Ser Leu Ile Met Asp Met Val Ser Asp Lys Gly Asn Leu Met Tyr Ser
 930 935 940
 Asp Asn Arg Ser Phe Gln Gly Lys Glu Ser Ile Phe Gly Asp Asn Met
 945 950 955 960
 Asn Glu Leu Gln Thr Phe Val Ala Asn Arg Gln Lys Asp Asn Leu Asn
 965 970 975
 Asn Tyr Val Phe Gln Gly Gln His Pro Leu Thr Leu Asn Glu Ser Asn
 980 985 990
 Pro Asn Thr Val Glu Val Ala Val Ser Thr Glu Ser Lys Ala Asn Ser
 995 1000 1005
 Arg Pro Arg Gln Leu Trp Lys Lys Ser Val Asp Ser Ile Arg Gln Asp
 1010 1015 1020
 Ser Leu Ser Gln Asn Pro Val Ser Gln Arg Asp Glu Ala Thr Ala Glu
 1025 1030 1035 1040
 Asn Arg Thr His Ser Leu Lys Ser Pro Arg Tyr Leu Pro Glu Glu Met
 1045 1050 1055
 Ala His Ser Asp Ile Ser Glu Thr Ser Asn Arg Ala Thr Cys His Arg
 1060 1065 1070
 Glu Pro Asp Asn Ser Lys Asn His Lys Thr Lys Asp Asn Phe Lys Arg
 1075 1080 1085
 Ser Val Ala Ser Lys Tyr Pro Lys Asp Cys Ser Glu Val Glu Arg Thr
 1090 1095 1100
 Tyr Leu Lys Thr Lys Ser Ser Ser Pro Arg Asp Lys Ile Tyr Thr Ile
 1105 1110 1115 1120
 Asp Gly Glu Lys Glu Pro Gly Phe His Leu Asp Pro Pro Gln Phe Val
 1125 1130 1135
 Glu Asn Val Thr Leu Pro Glu Asn Val Asp Phe Pro Asp Pro Tyr Gln
 1140 1145 1150
 Asp Pro Ser Glu Asn Phe Arg Lys Gly Asp Ser Thr Leu Pro Met Asn
 1155 1160 1165
 Arg Asn Pro Leu His Asn Glu Glu Gly Leu Ser Asn Asn Asp Gln Tyr
 1170 1175 1180

1000747 120701
 1000747 120701

Lys Leu Tyr Ser Lys His Phe Thr Leu Lys Asp Lys Gly Ser Pro His
 1185 1190 1195 1200
 Ser Glu Thr Ser Glu Arg Tyr Arg Gln Asn Ser Thr His Cys Arg Ser
 1205 1210 1215
 Cys Leu Ser Asn Met Pro Thr Tyr Ser Gly His Phe Thr Met Arg Ser
 1220 1225 1230
 Pro Phe Lys Cys Asp Ala Cys Leu Arg Met Gly Asn Leu Tyr Asp Ile
 1235 1240 1245
 Asp Glu Asp Gln Met Leu Gln Glu Thr Gly Asn Pro Ala Thr Gly Glu
 1250 1255 1260
 Gln Val Tyr Gln Gln Asp Trp Ala Gln Asn Asn Ala Leu Gln Leu Gln
 1265 1270 1275 1280
 Lys Asn Lys Leu Arg Ile Ser Arg Gln His Ser Tyr Asp Asn Ile Val
 1285 1290 1295
 Asp Lys Pro Arg Glu Leu Asp Leu Ser Arg Pro Ser Arg Ser Ile Ser
 1300 1305 1310
 Leu Lys Asp Arg Glu Arg Leu Leu Glu Gly Asn Phe Tyr Gly Ser Leu
 1315 1320 1325
 Phe Ser Val Pro Ser Ser Lys Leu Ser Gly Lys Lys Ser Ser Leu Phe
 1330 1335 1340
 Pro Gln Gly Leu Glu Asp Ser Lys Arg Ser Lys Ser Leu Leu Pro Asp
 1345 1350 1355 1360
 His Thr Ser Asp Asn Pro Phe Leu His Ser His Arg Asp Asp Gln Arg
 1365 1370 1375
 Leu Val Ile Gly Arg Cys Pro Ser Asp Pro Tyr Lys His Ser Leu Pro
 1380 1385 1390
 Ser Gln Ala Val Asn Asp Ser Tyr Leu Arg Ser Ser Leu Arg Ser Thr
 1395 1400 1405
 Ala Ser Tyr Cys Ser Arg Asp Ser Arg Gly His Asn Asp Val Tyr Ile
 1410 1415 1420
 Ser Glu His Val Met Pro Tyr Ala Ala Asn Lys Asn Asn Met Tyr Ser
 1425 1430 1435 1440
 Thr Pro Arg Val Leu Asn Ser Cys Ser Asn Arg Arg Val Tyr Lys Glu
 1445 1450 1455
 Met Pro Ser Ile Glu Ser Asp Val
 1460

(2) INFORMATION FOR SEQ ID NO:12:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 74 base pairs
 - (B) TYPE: nucleic acid
 - (C) STRANDEDNESS: both
 - (D) TOPOLOGY: both
- (ii) MOLECULE TYPE: cDNA

F04027" 440001

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

CGAGGGAGGC GGCCGGCGCG GACTCTCTTC GCGGGCGCAG CGCCCCTTCC CCCTCGGACC 60
CTCCGGTGGA CATG 74

(2) INFORMATION FOR SEQ ID NO:13:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 5538 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: both
- (D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 210..4664

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

TTGAATTTGC ATCTCTTCAA GACACAAGAT TAAACAAAA TTTACGCTAA ATTGGATTTT 60
AAATTATCTT CCGTTCATTT ATCCTTCGTC TTTCTTATGT GGATATGCAA GCGAGAAGAA 120
GGGACTGGAC ATTCCAACA TGCTCACTCC CTTAATCTGT CCGTCTAGAG GTTTGGCTTC 180
TACAAACCAA GGGAGTCGAC GAGTTGAAG ATG AAG CCC AGA GCG GAG TGC TGT 233
Met Lys Pro Arg Ala Glu Cys Cys
1 5
TCT CCC AAG TTC TGG TTG GTG TTG GCC GTC CTG GCC GTG TCA GGC AGC 281
Ser Pro Lys Phe Trp Leu Val Leu Ala Val Leu Ala Val Ser Gly Ser
10 15 20
AGA GCT CGT TCT CAG AAG AGC CCC CCC AGC ATT GGC ATT GCT GTC ATC 329
Arg Ala Arg Ser Gln Lys Ser Pro Pro Ser Ile Gly Ile Ala Val Ile
25 30 35 40
CTC GTG GGC ACT TCC GAC GAG GTG GCC ATC AAG GAT GCC CAC GAG AAA 377
Leu Val Gly Thr Ser Asp Glu Val Ala Ile Lys Asp Ala His Glu Lys
45 50 55
GAT GAT TTC CAC CAT CTC TCC GTG GTA CCC CGG GTG GAA CTG GTA GCC 425
Asp Asp Phe His His Leu Ser Val Val Pro Arg Val Glu Leu Val Ala
60 65 70
ATG AAT GAG ACC GAC CCA AAG AGC ATC ATC ACC CGC ATC TGT GAT CTC 473
Met Asn Glu Thr Asp Pro Lys Ser Ile Ile Thr Arg Ile Cys Asp Leu
75 80 85
ATG TCT GAC CGG AAG ATC CAG GGG GTG GTG TTT GCT GAT GAC ACA GAC 521
Met Ser Asp Arg Lys Ile Gln Gly Val Val Phe Ala Asp Asp Thr Asp
90 95 100
CAG GAA GCC ATC GCC CAG ATC CTC GAT TTC ATT TCA GCA CAG ACT CTC 569
Gln Glu Ala Ile Ala Gln Ile Leu Asp Phe Ile Ser Ala Gln Thr Leu
105 110 115 120
ACC CCG ATC CTG GGC ATC CAC GGG GGC TCC TCT ATG ATA ATG GCA GAT 617
Thr Pro Ile Leu Gly Ile His Gly Gly Ser Ser Met Ile Met Ala Asp
125 130 135

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| AAG | GAT | GAA | TCC | TCC | ATG | TTC | TTC | CAG | TTT | GGC | CCA | TCA | ATT | GAA | CAG | 665 |
| Lys | Asp | Glu | Ser | Ser | Met | Phe | Phe | Gln | Phe | Gly | Pro | Ser | Ile | Glu | Gln | |
| | | | 140 | | | | | 145 | | | | | 150 | | | |
| CAA | GCT | TCC | GTA | ATG | CTC | AAC | ATC | ATG | GAA | GAA | TAT | GAC | TGG | TAC | ATC | 713 |
| Gln | Ala | Ser | Val | Met | Leu | Asn | Ile | Met | Glu | Glu | Tyr | Asp | Trp | Tyr | Ile | |
| | | 155 | | | | | 160 | | | | | 165 | | | | |
| TTT | TCT | ATC | GTC | ACC | ACC | TAT | TTC | CCT | GGC | TAC | CAG | GAC | TTT | GTA | AAC | 761 |
| Phe | Ser | Ile | Val | Thr | Thr | Tyr | Phe | Pro | Gly | Tyr | Gln | Asp | Phe | Val | Asn | |
| | 170 | | | | | 175 | | | | | 180 | | | | | |
| AAG | ATC | CGC | AGC | ACC | ATT | GAG | AAT | AGC | TTT | GTG | GGC | TGG | GAG | CTA | GAG | 809 |
| Lys | Ile | Arg | Ser | Thr | Ile | Glu | Asn | Ser | Phe | Val | Gly | Trp | Glu | Leu | Glu | |
| 185 | | | | | 190 | | | | | 195 | | | | | 200 | |
| GAG | GTC | CTC | CTA | CTG | GAC | ATG | TCC | CTG | GAC | GAT | GGA | GAT | TCT | AAG | ATC | 857 |
| Glu | Val | Leu | Leu | Leu | Asp | Met | Ser | Leu | Asp | Asp | Gly | Asp | Ser | Lys | Ile | |
| | | | | 205 | | | | | 210 | | | | | 215 | | |
| CAG | AAT | CAG | CTC | AAG | AAA | CTT | CAA | AGC | CCC | ATC | ATT | CTT | CTT | TAC | TGT | 905 |
| Gln | Asn | Gln | Leu | Lys | Lys | Leu | Gln | Ser | Pro | Ile | Ile | Leu | Leu | Tyr | Cys | |
| | | | 220 | | | | | 225 | | | | | 230 | | | |
| ACC | AAG | GAA | GAA | GCC | ACC | TAC | ATC | TTT | GAA | GTG | GCC | AAC | TCA | GTA | GGG | 953 |
| Thr | Lys | Glu | Glu | Ala | Thr | Tyr | Ile | Phe | Glu | Val | Ala | Asn | Ser | Val | Gly | |
| | | 235 | | | | | 240 | | | | | 245 | | | | |
| CTG | ACT | GGC | TAT | GGC | TAC | ACG | TGG | ATC | GTG | CCC | AGT | CTG | GTG | GCA | GGG | 1001 |
| Leu | Thr | Gly | Tyr | Gly | Tyr | Thr | Trp | Ile | Val | Pro | Ser | Leu | Val | Ala | Gly | |
| | 250 | | | | | 255 | | | | | 260 | | | | | |
| GAT | ACA | GAC | ACA | GTG | CCT | GCG | GAG | TTC | CCC | ACT | GGG | CTC | ATC | TCT | GTA | 1049 |
| Asp | Thr | Asp | Thr | Val | Pro | Ala | Glu | Phe | Pro | Thr | Gly | Leu | Ile | Ser | Val | |
| 265 | | | | | 270 | | | | | 275 | | | | | 280 | |
| TCA | TAT | GAT | GAA | TGG | GAC | TAT | GGC | CTC | CCC | CCC | AGA | GTG | AGA | GAT | GGA | 1097 |
| Ser | Tyr | Asp | Glu | Trp | Asp | Tyr | Gly | Leu | Pro | Pro | Arg | Val | Arg | Asp | Gly | |
| | | | | 285 | | | | | 290 | | | | | 295 | | |
| ATT | GCC | ATA | ATC | ACC | ACT | GCT | GCT | TCT | GAC | ATG | CTG | TCT | GAG | CAC | AGC | 1145 |
| Ile | Ala | Ile | Ile | Thr | Thr | Ala | Ala | Ser | Asp | Met | Leu | Ser | Glu | His | Ser | |
| | | | 300 | | | | | 305 | | | | | 310 | | | |
| TTC | ATC | CCT | GAG | CCC | AAA | AGC | AGT | TGT | TAC | AAC | ACC | CAC | GAG | AAG | AGA | 1193 |
| Phe | Ile | Pro | Glu | Pro | Lys | Ser | Ser | Cys | Tyr | Asn | Thr | His | Glu | Lys | Arg | |
| | | 315 | | | | | 320 | | | | | 325 | | | | |
| ATC | TAC | CAG | TCC | AAT | ATG | CTA | AAT | AGG | TAT | CTG | ATC | AAT | GTC | ACT | TTT | 1241 |
| Ile | Tyr | Gln | Ser | Asn | Met | Leu | Asn | Arg | Tyr | Leu | Ile | Asn | Val | Thr | Phe | |
| | 330 | | | | | 335 | | | | | 340 | | | | | |
| GAG | GGG | AGG | AAT | TTG | TCC | TTC | AGT | GAA | GAT | GGC | TAC | CAG | ATG | CAC | CCG | 1289 |
| Glu | Gly | Arg | Asn | Leu | Ser | Phe | Ser | Glu | Asp | Gly | Tyr | Gln | Met | His | Pro | |
| 345 | | | | | 350 | | | | | 355 | | | | | 360 | |
| AAA | CTG | GTG | ATA | ATT | CTT | CTG | AAC | AAG | GAG | AGG | AAG | TGG | GAA | AGG | GTG | 1337 |
| Lys | Leu | Val | Ile | Ile | Leu | Leu | Asn | Lys | Glu | Arg | Lys | Trp | Glu | Arg | Val | |
| | | | | 365 | | | | | 370 | | | | | 375 | | |
| GGG | AAG | TGG | AAA | GAC | AAG | TCC | CTG | CAG | ATG | AAG | TAC | TAT | GTG | TGG | CCC | 1385 |
| Gly | Lys | Trp | Lys | Asp | Lys | Ser | Leu | Gln | Met | Lys | Tyr | Tyr | Val | Trp | Pro | |
| | | | 380 | | | | | 385 | | | | | 390 | | | |
| CGA | ATG | TGT | CCA | GAG | ACT | GAA | GAG | CAG | GAG | GAT | GAC | CAT | CTG | AGC | ATT | 1433 |
| Arg | Met | Cys | Pro | Glu | Thr | Glu | Glu | Gln | Glu | Asp | Asp | His | Leu | Ser | Ile | |
| | | 395 | | | | | 400 | | | | | 405 | | | | |

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| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| GTG | ACC | CTG | GAG | GAG | GCA | CCA | TTT | GTC | ATT | GTG | GAA | AGT | GTG | GAC | CCT | 1481 |
| Val | Thr | Leu | Glu | Glu | Ala | Pro | Phe | Val | Ile | Val | Glu | Ser | Val | Asp | Pro | |
| | 410 | | | | | 415 | | | | | 420 | | | | | |
| CTG | AGT | GGA | ACC | TGC | ATG | AGG | AAC | ACA | GTC | CCC | TGC | CAA | AAA | CGC | ATA | 1529 |
| Leu | Ser | Gly | Thr | Cys | Met | Arg | Asn | Thr | Val | Pro | Cys | Gln | Lys | Arg | Ile | |
| 425 | | | | | 430 | | | | | 435 | | | | | 440 | |
| GTC | ACT | GAG | AAT | AAA | ACA | GAC | GAG | GAG | CCG | GGT | TAC | ATC | AAA | AAA | TGC | 1577 |
| Val | Thr | Glu | Asn | Lys | Thr | Asp | Glu | Glu | Pro | Gly | Tyr | Ile | Lys | Lys | Cys | |
| | | | | 445 | | | | | 450 | | | | | | 455 | |
| TGC | AAG | GGG | TTC | TGT | ATT | GAC | ATC | CTT | AAG | AAA | ATT | TCT | AAA | TCT | GTG | 1625 |
| Cys | Lys | Gly | Phe | Cys | Ile | Asp | Ile | Leu | Lys | Lys | Ile | Ser | Lys | Ser | Val | |
| | | | 460 | | | | | 465 | | | | | | 470 | | |
| AAG | TTC | ACC | TAT | GAC | CTT | TAC | CTG | GTT | ACC | AAT | GGC | AAG | CAT | GGG | AAG | 1673 |
| Lys | Phe | Thr | Tyr | Asp | Leu | Tyr | Leu | Val | Thr | Asn | Gly | Lys | His | Gly | Lys | |
| | | 475 | | | | | 480 | | | | | 485 | | | | |
| AAA | ATC | AAT | GGA | ACC | TGG | AAT | GGT | ATG | ATT | GGA | GAG | GTG | GTC | ATG | AAG | 1721 |
| Lys | Ile | Asn | Gly | Thr | Trp | Asn | Gly | Met | Ile | Gly | Glu | Val | Val | Met | Lys | |
| | 490 | | | | | 495 | | | | | 500 | | | | | |
| AGG | GCC | TAC | ATG | GCA | GTG | GGC | TCA | CTC | ACC | ATC | AAT | GAG | GAA | CGA | TCG | 1769 |
| Arg | Ala | Tyr | Met | Ala | Val | Gly | Ser | Leu | Thr | Ile | Asn | Glu | Glu | Arg | Ser | |
| 505 | | | | | 510 | | | | | 515 | | | | | 520 | |
| GAG | GTG | GTC | GAC | TTC | TCT | GTG | CCC | TTC | ATA | GAG | ACA | GGC | ATC | AGT | GTC | 1817 |
| Glu | Val | Val | Asp | Phe | Ser | Val | Pro | Phe | Ile | Glu | Thr | Gly | Ile | Ser | Val | |
| | | | | 525 | | | | | 530 | | | | | | 535 | |
| ATG | GTG | TCA | CGC | AGC | AAT | GGG | ACT | GTC | TCA | CCT | TCT | GCC | TTC | TTA | GAG | 1865 |
| Met | Val | Ser | Arg | Ser | Asn | Gly | Thr | Val | Ser | Pro | Ser | Ala | Phe | Leu | Glu | |
| | | | 540 | | | | | 545 | | | | | 550 | | | |
| CCA | TTC | AGC | GCT | GAC | GTA | TGG | GTG | ATG | ATG | TTT | GTG | ATG | CTG | CTC | ATC | 1913 |
| Pro | Phe | Ser | Ala | Asp | Val | Trp | Val | Met | Met | Phe | Val | Met | Leu | Leu | Ile | |
| | | 555 | | | | | 560 | | | | | 565 | | | | |
| GTC | TCA | GCC | GTG | GCT | GTC | TTT | GTC | TTT | GAG | TAC | TTC | AGC | CCT | GTG | GGT | 1961 |
| Val | Ser | Ala | Val | Ala | Val | Phe | Val | Phe | Glu | Tyr | Phe | Ser | Pro | Val | Gly | |
| | 570 | | | | | 575 | | | | | 580 | | | | | |
| TAT | AAC | AGG | TGC | CTC | GCT | GAT | GGC | AGA | GAG | CCT | GGT | GGA | CCC | TCT | TTC | 2009 |
| Tyr | Asn | Arg | Cys | Leu | Ala | Asp | Gly | Arg | Glu | Pro | Gly | Gly | Pro | Ser | Phe | |
| 585 | | | | | 590 | | | | | 595 | | | | | 600 | |
| ACC | ATC | GGC | AAA | GCT | ATT | TGG | TTG | CTC | TGG | GGT | CTG | GTG | TTT | AAC | AAC | 2057 |
| Thr | Ile | Gly | Lys | | Ile | Trp | Leu | Leu | Trp | Gly | Leu | Val | Phe | Asn | Asn | |
| | | | | 605 | | | | | 610 | | | | | 615 | | |
| TCC | GTA | CCT | GTG | CAG | AAC | CCA | AAG | GGG | ACC | ACC | TCC | AAG | ATC | ATG | GTG | 2105 |
| Ser | Val | Pro | Val | Gln | Asn | Pro | Lys | Gly | Thr | Thr | Ser | Lys | Ile | Met | Val | |
| | | | 620 | | | | | 625 | | | | | 630 | | | |
| TCA | GTG | TGG | GCC | TTC | TTT | GCT | GTC | ATC | TTC | CTG | GCC | AGC | TAC | ACT | GCC | 2153 |
| Ser | Val | Trp | Ala | Phe | Phe | Ala | Val | Ile | Phe | Leu | Ala | Ser | Tyr | Thr | Ala | |
| | | 635 | | | | | 640 | | | | | 645 | | | | |
| AAC | TTA | GCT | GCC | TTC | ATG | ATC | CAA | GAG | GAA | TAT | GTG | GAC | CAG | GTT | TCT | 2201 |
| Asn | Leu | Ala | Ala | Phe | Met | Ile | Gln | Glu | Glu | Tyr | Val | Asp | Gln | Val | Ser | |
| | 650 | | | | | 655 | | | | | 660 | | | | | |
| GGC | CTG | AGC | GAC | AAA | AAG | TTC | CAG | AGA | CCT | AAT | GAC | TTC | TCA | CCC | CCT | 2249 |
| Gly | Leu | Ser | Asp | Lys | Lys | Phe | Gln | Arg | Pro | Asn | Asp | Phe | Ser | Pro | Pro | |
| 665 | | | | | 670 | | | | | 675 | | | | | 680 | |

T0203T 242000T

| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| TTC | CGC | TTT | GGG | ACC | GTG | CCC | AAC | GGC | AGC | ACA | GAG | AGA | AAT | ATT | CGC | 2297 |
| Phe | Arg | Phe | Gly | Thr | Val | Pro | Asn | Gly | Ser | Thr | Glu | Arg | Asn | Ile | Arg | |
| | | | | 685 | | | | | 690 | | | | | 695 | | |
| AAT | AAC | TAT | GCA | GAA | ATG | CAT | GCC | TAC | ATG | GGA | AAG | TTC | AAC | CAG | AGG | 2345 |
| Asn | Asn | Tyr | Ala | Glu | Met | His | Ala | Tyr | Met | Gly | Lys | Phe | Asn | Gln | Arg | |
| | | | 700 | | | | | 705 | | | | | 710 | | | |
| GGT | GTA | GAT | GAT | GCA | TTG | CTC | TCC | CTG | AAA | ACA | GGG | AAA | CTG | GAT | GCC | 2393 |
| Gly | Val | Asp | Asp | Ala | Leu | Leu | Ser | Leu | Lys | Thr | Gly | Lys | Leu | Asp | Ala | |
| | | 715 | | | | | 720 | | | | | 725 | | | | |
| TTC | ATC | TAT | GAT | GCA | GCA | GTG | CTG | AAC | TAT | ATG | GCA | GGC | AGA | GAT | GAA | 2441 |
| Phe | Ile | Tyr | Asp | Ala | Ala | Val | Leu | Asn | Tyr | Met | Ala | Gly | Arg | Asp | Glu | |
| | 730 | | | | | 735 | | | | | 740 | | | | | |
| GGC | TGC | AAG | CTG | GTG | ACC | ATT | GGC | AGT | GGG | AAG | GTC | TTT | GCT | TCC | ACT | 2489 |
| Gly | Cys | Lys | Leu | Val | Thr | Ile | Gly | Ser | Gly | Lys | Val | Phe | Ala | Ser | Thr | |
| | 745 | | | | 750 | | | | | 755 | | | | | 760 | |
| GGC | TAT | GGC | ATT | GCC | ATC | CAA | AAA | GAT | TCT | GGG | TGG | AAG | CGC | CAG | GTG | 2537 |
| Gly | Tyr | Gly | Ile | Ala | Ile | Gln | Lys | Asp | Ser | Gly | Trp | Lys | Arg | Gln | Val | |
| | | | | 765 | | | | | 770 | | | | | 775 | | |
| GAC | CTT | GCT | ATC | CTG | CAG | CTC | TTT | GGA | GAT | GGG | GAG | ATG | GAA | GAA | CTG | 2585 |
| Asp | Leu | Ala | Ile | Leu | Gln | Leu | Phe | Gly | Asp | Gly | Glu | Met | Glu | Glu | Leu | |
| | | | 780 | | | | | 785 | | | | | 790 | | | |
| GAA | GCT | CTC | TGG | CTC | ACT | GGC | ATT | TGT | CAC | AAT | GAG | AAG | AAT | GAG | GTC | 2633 |
| Glu | Ala | Leu | Trp | Leu | Thr | Gly | Ile | Cys | His | Asn | Glu | Lys | Asn | Glu | Val | |
| | | 795 | | | | | 800 | | | | | 805 | | | | |
| ATG | AGC | AGC | CAG | CTG | GAC | ATT | GAC | AAC | ATG | GCA | GGG | GTC | TTC | TAC | ATG | 2681 |
| Met | Ser | Ser | Gln | Leu | Asp | Ile | Asp | Asn | Met | Ala | Gly | Val | Phe | Tyr | Met | |
| | 810 | | | | | 815 | | | | | 820 | | | | | |
| TTG | GGG | GCG | GCC | ATG | GCT | CTC | AGC | CTC | ATC | ACC | TTC | ATC | TGC | GAA | CAC | 2729 |
| Leu | Gly | Ala | Ala | Met | Ala | Leu | Ser | Leu | Ile | Thr | Phe | Ile | Cys | Glu | His | |
| | 825 | | | | 830 | | | | | 835 | | | | | 840 | |
| CTT | TTC | TAT | TGG | CAG | TTC | CGA | CAT | TGC | TTT | ATG | GGT | GTC | TGT | TCT | GGC | 2777 |
| Leu | Phe | Tyr | Trp | Gln | Phe | Arg | His | Cys | Phe | Met | Gly | Val | Cys | Ser | Gly | |
| | | | | 845 | | | | 850 | | | | | | 855 | | |
| AAG | CCT | GGC | ATG | GTC | TTC | TCC | ATC | AGC | AGA | GGT | ATC | TAC | AGC | TGC | ATC | 2825 |
| Lys | Pro | Gly | Met | Val | Phe | Ser | Ile | Ser | Arg | Gly | Ile | Tyr | Ser | Cys | Ile | |
| | | | 860 | | | | | 865 | | | | | 870 | | | |
| CAT | GGG | GTG | GCG | ATC | GAG | GAG | CGC | CAG | TCT | GTA | ATG | AAC | TCC | CCC | ACC | 2873 |
| His | Gly | Val | Ala | Ile | Glu | Glu | Arg | Gln | Ser | Val | Met | Asn | Ser | Pro | Thr | |
| | | 875 | | | | | 880 | | | | | 885 | | | | |
| GCA | ACC | ATG | AAC | AAC | ACA | CAC | TCC | AAC | ATC | CTG | CGC | CTG | CTG | CGC | ACG | 2921 |
| Ala | Thr | Met | Asn | Asn | Thr | His | Ser | Asn | Ile | Leu | Arg | Leu | Leu | Arg | Thr | |
| | 890 | | | | | 895 | | | | | 900 | | | | | |
| GCC | AAG | AAC | ATG | GCT | AAC | CTG | TCT | GGT | GTG | AAT | GGC | TCA | CCG | CAG | AGC | 2969 |
| Ala | Lys | Asn | Met | Ala | Asn | Leu | Ser | Gly | Val | Asn | Gly | Ser | Pro | Gln | Ser | |
| | 905 | | | | 910 | | | | | 915 | | | | | 920 | |
| GCC | CTG | GAC | TTC | ATC | CGA | CGG | GAG | TCA | TCC | GTC | TAT | GAC | ATC | TCA | GAG | 3017 |
| Ala | Leu | Asp | Phe | Ile | Arg | Arg | Glu | Ser | Ser | Val | Tyr | Asp | Ile | Ser | Glu | |
| | | | | 925 | | | | | 930 | | | | | 935 | | |
| CAC | CGC | CGC | AGC | TTC | ACG | CAT | TCT | GAC | TGC | AAA | TCC | TAC | AAC | AAC | CCG | 3065 |
| His | Arg | Arg | Ser | Phe | Thr | His | Ser | Asp | Cys | Lys | Ser | Tyr | Asn | Asn | Pro | |
| | | | 940 | | | | | 945 | | | | | 950 | | | |

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|---|------|
| CCC TGT GAG GAG AAC CTC TTC AGT GAC TAC ATC AGT GAG GTA GAG AGA Pro Cys Glu Glu Asn Leu Phe Ser Asp Tyr Ile Ser Glu Val Glu Arg 955 960 965 | 3113 |
| ACG TTC GGG AAC CTG CAG CTG AAG GAC AGC AAC GTG TAC CAA GAT CAC Thr Phe Gly Asn Leu Gln Leu Lys Asp Ser Asn Val Tyr Gln Asp His 970 975 980 | 3161 |
| TAC CAC CAT CAC CAC CGG CCC CAT AGT ATT GGC AGT GCC AGC TCC ATC Tyr His His His His Arg Pro His Ser Ile Gly Ser Ala Ser Ser Ile 985 990 995 1000 | 3209 |
| GAT GGG CTC TAC GAC TGT GAC AAC CCA CCC TTC ACC ACC CAG TCC AGG Asp Gly Leu Tyr Asp Cys Asp Asn Pro Pro Phe Thr Thr Gln Ser Arg 1005 1010 1015 | 3257 |
| TCC ATC AGC AAG AAG CCC CTG GAC ATC GGC CTC CCC TCC TCC AAG CAC Ser Ile Ser Lys Lys Pro Leu Asp Ile Gly Leu Pro Ser Ser Lys His 1020 1025 1030 | 3305 |
| AGC CAG CTC AGT GAC CTG TAC GGC AAA TTC TCC TTC AAG AGC GAC CGC Ser Gln Leu Ser Asp Leu Tyr Gly Lys Phe Ser Phe Lys Ser Asp Arg 1035 1040 1045 | 3353 |
| TAC AGT GGC CAC GAC GAC TTG ATC CGC TCC GAT GTC TCT GAC ATC TCA Tyr Ser Gly His Asp Asp Leu Ile Arg Ser Asp Val Ser Asp Ile Ser 1050 1055 1060 | 3401 |
| ACC CAC ACC GTC ACC TAT GGG AAC ATC GAG GGC AAT GCC GCC AAG AGG Thr His Thr Val Thr Tyr Gly Asn Ile Glu Gly Asn Ala Ala Lys Arg 1065 1070 1075 1080 | 3449 |
| CGT AAG CAG CAA TAT AAG GAC AGC CTG AAG AAG CGG CCT GCC TCG GCC Arg Lys Gln Gln Tyr Lys Asp Ser Leu Lys Lys Arg Pro Ala Ser Ala 1085 1090 1095 | 3497 |
| AAG TCC CGC AGG GAG TTT GAC GAG ATC GAG CTG GCC TAC CGT CGC CGA Lys Ser Arg Arg Glu Phe Asp Glu Ile Glu Leu Ala Tyr Arg Arg Arg 1100 1105 1110 | 3545 |
| CCG CCC CGC TCC CCT GAC CAC AAG CGC TAC TTC AGG GAC AAG GAA GGG Pro Pro Arg Ser Pro Asp His Lys Arg Tyr Phe Arg Asp Lys Glu Gly 1115 1120 1125 | 3593 |
| CTA CGG GAC TTC TAC CTG GAC CAG TTC CGA ACA AAG GAG AAC TCA CCC Leu Arg Asp Phe Tyr Leu Asp Gln Phe Arg Thr Lys Glu Asn Ser Pro 1130 1135 1140 | 3641 |
| CAC TGG GAG CAC GTA GAC CTG ACC GAC ATC TAC AAG GAG CGG AGT GAT His Trp Glu His Val Asp Leu Thr Asp Ile Tyr Lys Glu Arg Ser Asp 1145 1150 1155 1160 | 3689 |
| GAC TTT AAG CGC GAC TCC ATC AGC GGA GGA GGG CCC TGT ACC AAC AGG Asp Phe Lys Arg Asp Ser Ile Ser Gly Gly Gly Pro Cys Thr Asn Arg 1165 1170 1175 | 3737 |
| TCT CAC ATC AAG CAC GGG ACG GGC GAC AAA CAC GGC GTG GTC AGC GGG Ser His Ile Lys His Gly Thr Gly Asp Lys His Gly Val Val Ser Gly 1180 1185 1190 | 3785 |
| GTA CCT GCA CCT TGG GAG AAG AAC CTG ACC AAC GTG GAG TGG GAG GAC Val Pro Ala Pro Trp Glu Lys Asn Leu Thr Asn Val Glu Trp Glu Asp 1195 1200 1205 | 3833 |
| CGG TCC GGG GGC AAC TTC TGC CGC AGC TGT CCC TCC AAG CTG CAC AAC Arg Ser Gly Gly Asn Phe Cys Arg Ser Cys Pro Ser Lys Leu His Asn 1210 1215 1220 | 3881 |

| | |
|---|------|
| TAC TCC ACG ACG GTG ACG GGT CAG AAC TCG GGC AGG CAG GCG TGC ATC Tyr Ser Thr Thr Val Thr Gly Gln Asn Ser Gly Arg Gln Ala Cys Ile 1225 1230 1235 1240 | 3929 |
| CGG TGT GAG GCT TGC AAG AAA GCA GGC AAC CTG TAT GAC ATC AGT GAG Arg Cys Glu Ala Cys Lys Lys Ala Gly Asn Leu Tyr Asp Ile Ser Glu 1245 1250 1255 | 3977 |
| GAC AAC TCC CTG CAG GAA CTG GAC CAG CCG GCT GCC CCA GTG GCG GTG Asp Asn Ser Leu Gln Glu Leu Asp Gln Pro Ala Ala Pro Val Ala Val 1260 1265 1270 | 4025 |
| ACG TCA AAC GCC TCC ACC ACT AAG TAC CCT CAG AGC CCG ACT AAT TCC Thr Ser Asn Ala Ser Thr Thr Lys Tyr Pro Gln Ser Pro Thr Asn Ser 1275 1280 1285 | 4073 |
| AAG GCC CAG AAG AAG AAC CGG AAC AAA CTG CGC CGG CAG CAC TCC TAC Lys Ala Gln Lys Lys Asn Arg Asn Lys Leu Arg Arg Gln His Ser Tyr 1290 1295 1300 | 4121 |
| GAC ACC TTC GTG GAC CTG CAG AAG GAA GAA GCC GCC CTG GCC CCG CGC Asp Thr Phe Val Asp Leu Gln Lys Glu Glu Ala Ala Leu Ala Pro Arg 1305 1310 1315 1320 | 4169 |
| AGC GTA AGC CTG AAA GAC AAG GGC CGA TTC ATG GAT GGG AGC CCC TAC Ser Val Ser Leu Lys Asp Lys Gly Arg Phe Met Asp Gly Ser Pro Tyr 1325 1330 1335 | 4217 |
| GCC CAC ATG TTT GAG ATG TCA GCT GGC GAG AGC ACC TTT GCC AAC AAC Ala His Met Phe Glu Met Ser Ala Gly Glu Ser Thr Phe Ala Asn Asn 1340 1345 1350 | 4265 |
| AAG TCC TCA GTG CCC ACT GCC GGA CAT CAC CAC CAC AAC AAC CCC GGC Lys Ser Ser Val Pro Thr Ala Gly His His His His Asn Asn Pro Gly 1355 1360 1365 | 4313 |
| GGC GGG TAC ATG CTC AGC AAG TCG CTC TAC CCT GAC CGG GTC ACG CAA Gly Gly Tyr Met Leu Ser Lys Ser Leu Tyr Pro Asp Arg Val Thr Gln 1370 1375 1380 | 4361 |
| AAC CCT TTC ATC CCC ACT TTT GGG GAC GAC CAG TGC TTG CTC CAT GGC Asn Pro Phe Ile Pro Thr Phe Gly Asp Asp Gln Cys Leu Leu His Gly 1385 1390 1395 1400 | 4409 |
| AGC AAA TCC TAC TTC TTC AGG CAG CCC ACG GTG GCG GGG GCG TCG AAA Ser Lys Ser Tyr Phe Phe Arg Gln Pro Thr Val Ala Gly Ala Ser Lys 1405 1410 1415 | 4457 |
| GCC AGG CCG GAC TTC CGG GCC CTT GTC ACC AAC AAG CCG GTG GTC TCG Ala Arg Pro Asp Phe Arg Ala Leu Val Thr Asn Lys Pro Val Val Ser 1420 1425 1430 | 4505 |
| GCC CTT CAT GGG GCC GTG CCA GCC CGT TTC CAG AAG GAC ATC TGT ATA Ala Leu His Gly Ala Val Pro Ala Arg Phe Gln Lys Asp Ile Cys Ile 1435 1440 1445 | 4553 |
| GGG AAC CAG TCC AAC CCC TGT GTG CCT AAC AAC ACA AAC CCC AGG GCT Gly Asn Gln Ser Asn Pro Cys Val Pro Asn Asn Thr Asn Pro Arg Ala 1450 1455 1460 | 4601 |
| TTC AAT GGC TCC AGC AAT GGG CAT GTT TAT GAG AAA CTT TCT AGT ATT Phe Asn Gly Ser Ser Asn Gly His Val Tyr Glu Lys Leu Ser Ser Ile 1465 1470 1475 1480 | 4649 |
| GAG TCT GAT GTC TGAGTGAGGG AACAGAGAGG TTAAGGTGGG TACGGGAGGG Glu Ser Asp Val | 4701 |

TAAGGCTGTG GGTCGCGTGA TGCGCATGTC ACGGAGGGTG ACGGGGGTGA ACTTG GTTCC 4761
 CATTTGCTCC TTTCTTGTTT TAATTTATTT ATGGGATCCT GGAGTTCTGG TTCCTACTGG 4821
 GGGCAACCCT GGTGACCAGC ACCATCTCTC CTCCTTTTCA CAGTTCTCTC CTTCTTCCCC 4881
 CCGCTGTCAG CCATTCTGT TCCCATGAGA TGATGCCATG GGCCCTCTCA GCAGGGGAGG 4941
 GTAGAGCGGA GAAAGGAAGG GCTGCATGCG GGCTTCCTCC TGGTGTGGAA GAGCTCCTTG 5001
 ATATCCTCTT TGAGTGAAGC TGGGAGAACC AAAAAGAGGC TATGTGAGCA CAAAGGTAGC 5061
 TTTTCCCAA CTGATCTTTT CATTTAGGTG AGGAAGCAAA AGCATCTATG TGAGACCATT 5121
 TAGCACACTG CTTGTGAAAG GAAAGAGGCT CTGGCTAAAT TCATGCTGCT TAGATGACAT 5181
 CTGTCTAGGA ATCATGTGCC AAGCAGAGGT TGGGAGGCCA TTTGTGTTTA TATATAAGCC 5241
 CAAAATGCT TGCTTCAACC CCATGAGACT CGATAGTGGT GGTGAACAGA ACCCAAGGTC 5301
 ATTGGTGGCA GAGTGGATTC TTGAACAAAC TGGAAAGTAC GTTATGATAG TGTCCCCCGG 5361
 TGCCTTGGGG ACAAGAGCAG GTGGATTGTG CGTGCATGTG TGTTTCATGCA CACTTGCACC 5421
 CATGTGTAGT CAGGTGCCTC AAGAGAAGGC AACCTTGACT CTTTCGTTGA ATTTGCATCT 5481
 CTTCAAGACA CAAGATTAAA ACAAATTTA CGCTAAATTG GATTTTAAAT TATCTTC 5538

(2) INFORMATION FOR SEQ ID NO:14:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 1484 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

Met Lys Pro Arg Ala Glu Cys Cys Ser Pro Lys Phe Trp Leu Val Leu
 1 5 10 15
 Ala Val Leu Ala Val Ser Gly Ser Arg Ala Arg Ser Gln Lys Ser Pro
 20 25 30
 Pro Ser Ile Gly Ile Ala Val Ile Leu Val Gly Thr Ser Asp Glu Val
 35 40 45
 Ala Ile Lys Asp Ala His Glu Lys Asp Asp Phe His His Leu Ser Val
 50 55 60
 Val Pro Arg Val Glu Leu Val Ala Met Asn Glu Thr Asp Pro Lys Ser
 65 70 75 80
 Ile Ile Thr Arg Ile Cys Asp Leu Met Ser Asp Arg Lys Ile Gln Gly
 85 90 95
 Val Val Phe Ala Asp Asp Thr Asp Gln Glu Ala Ile Ala Gln Ile Leu
 100 105 110
 Asp Phe Ile Ser Ala Gln Thr Leu Thr Pro Ile Leu Gly Ile His Gly
 115 120 125
 Gly Ser Ser Met Ile Met Ala Asp Lys Asp Glu Ser Ser Met Phe Phe
 130 135 140

1000747 120701

Gln Phe Gly Pro Ser Ile Glu Gln Gln Ala Ser Val Met Leu Asn Ile
 145 150 155 160
 Met Glu Glu Tyr Asp Trp Tyr Ile Phe Ser Ile Val Thr Thr Tyr Phe
 165 170 175
 Pro Gly Tyr Gln Asp Phe Val Asn Lys Ile Arg Ser Thr Ile Glu Asn
 180 185 190
 Ser Phe Val Gly Trp Glu Leu Glu Glu Val Leu Leu Leu Asp Met Ser
 195 200 205
 Leu Asp Asp Gly Asp Ser Lys Ile Gln Asn Gln Leu Lys Lys Leu Gln
 210 215 220
 Ser Pro Ile Ile Leu Leu Tyr Cys Thr Lys Glu Glu Ala Thr Tyr Ile
 225 230 235 240
 Phe Glu Val Ala Asn Ser Val Gly Leu Thr Gly Tyr Gly Tyr Thr Trp
 245 250 255
 Ile Val Pro Ser Leu Val Ala Gly Asp Thr Asp Thr Val Pro Ala Glu
 260 265 270
 Phe Pro Thr Gly Leu Ile Ser Val Ser Tyr Asp Glu Trp Asp Tyr Gly
 275 280 285
 Leu Pro Pro Arg Val Arg Asp Gly Ile Ala Ile Ile Thr Thr Ala Ala
 290 295 300
 Ser Asp Met Leu Ser Glu His Ser Phe Ile Pro Glu Pro Lys Ser Ser
 305 310 315 320
 Cys Tyr Asn Thr His Glu Lys Arg Ile Tyr Gln Ser Asn Met Leu Asn
 325 330 335
 Arg Tyr Leu Ile Asn Val Thr Phe Glu Gly Arg Asn Leu Ser Phe Ser
 340 345 350
 Glu Asp Gly Tyr Gln Met His Pro Lys Leu Val Ile Ile Leu Leu Asn
 355 360 365
 Lys Glu Arg Lys Trp Glu Arg Val Gly Lys Trp Lys Asp Lys Ser Leu
 370 375 380
 Gln Met Lys Tyr Tyr Val Trp Pro Arg Met Cys Pro Glu Thr Glu Glu
 385 390 395 400
 Gln Glu Asp Asp His Leu Ser Ile Val Thr Leu Glu Glu Ala Pro Phe
 405 410 415
 Val Ile Val Glu Ser Val Asp Pro Leu Ser Gly Thr Cys Met Arg Asn
 420 425 430
 Thr Val Pro Cys Gln Lys Arg Ile Val Thr Glu Asn Lys Thr Asp Glu
 435 440 445
 Glu Pro Gly Tyr Ile Lys Lys Cys Cys Lys Gly Phe Cys Ile Asp Ile
 450 455 460
 Leu Lys Lys Ile Ser Lys Ser Val Lys Phe Thr Tyr Asp Leu Tyr Leu
 465 470 475 480
 Val Thr Asn Gly Lys His Gly Lys Lys Ile Asn Gly Thr Trp Asn Gly
 485 490 495

1000744-10001
 1000744-10001

Met Ile Gly Glu Val Val Met Lys Arg Ala Tyr Met Ala Val Gly Ser
500 505 510

Leu Thr Ile Asn Glu Glu Arg Ser Glu Val Val Asp Phe Ser Val Pro
515 520 525

Phe Ile Glu Thr Gly Ile Ser Val Met Val Ser Arg Ser Asn Gly Thr
530 535 540

Val Ser Pro Ser Ala Phe Leu Glu Pro Phe Ser Ala Asp Val Trp Val
545 550 555 560

Met Met Phe Val Met Leu Leu Ile Val Ser Ala Val Ala Val Phe Val
565 570 575

Phe Glu Tyr Phe Ser Pro Val Gly Tyr Asn Arg Cys Leu Ala Asp Gly
580 585 590

Arg Glu Pro Gly Gly Pro Ser Phe Thr Ile Gly Lys Ala Ile Trp Leu
595 600 605

Leu Trp Gly Leu Val Phe Asn Asn Ser Val Pro Val Gln Asn Pro Lys
610 615 620

Gly Thr Thr Ser Lys Ile Met Val Ser Val Trp Ala Phe Phe Ala Val
625 630 635 640

Ile Phe Leu Ala Ser Tyr Thr Ala Asn Leu Ala Ala Phe Met Ile Gln
645 650 655

Glu Glu Tyr Val Asp Gln Val Ser Gly Leu Ser Asp Lys Lys Phe Gln
660 665 670

Arg Pro Asn Asp Phe Ser Pro Pro Phe Arg Phe Gly Thr Val Pro Asn
675 680 685

Gly Ser Thr Glu Arg Asn Ile Arg Asn Asn Tyr Ala Glu Met His Ala
690 695 700

Tyr Met Gly Lys Phe Asn Gln Arg Gly Val Asp Asp Ala Leu Leu Ser
705 710 715 720

Leu Lys Thr Gly Lys Leu Asp Ala Phe Ile Tyr Asp Ala Ala Val Leu
725 730 735

Asn Tyr Met Ala Gly Arg Asp Glu Gly Cys Lys Leu Val Thr Ile Gly
740 745 750

Ser Gly Lys Val Phe Ala Ser Thr Gly Tyr Gly Ile Ala Ile Gln Lys
755 760 765

Asp Ser Gly Trp Lys Arg Gln Val Asp Leu Ala Ile Leu Gln Leu Phe
770 775 780

Gly Asp Gly Glu Met Glu Glu Leu Glu Ala Leu Trp Leu Thr Gly Ile
785 790 795 800

Cys His Asn Glu Lys Asn Glu Val Met Ser Ser Gln Leu Asp Ile Asp
805 810 815

Asn Met Ala Gly Val Phe Tyr Met Leu Gly Ala Ala Met Ala Leu Ser
820 825 830

Leu Ile Thr Phe Ile Cys Glu His Leu Phe Tyr Trp Gln Phe Arg His
835 840 845

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| | | | | | | | | | | | | | | | | |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--|
| Cys | Phe | Met | Gly | Val | Cys | Ser | Gly | Lys | Pro | Gly | Met | Val | Phe | Ser | Ile | |
| 850 | | | | | | | 855 | | | | 860 | | | | | |
| Ser | Arg | Gly | Ile | Tyr | Ser | Cys | Ile | His | Gly | Val | Ala | Ile | Glu | Glu | Arg | |
| 865 | | | | | 870 | | | | | 875 | | | | | 880 | |
| Gln | Ser | Val | Met | Asn | Ser | Pro | Thr | Ala | Thr | Met | Asn | Asn | Thr | His | Ser | |
| | | | | 885 | | | | | 890 | | | | | 895 | | |
| Asn | Ile | Leu | Arg | Leu | Leu | Arg | Thr | Ala | Lys | Asn | Met | Ala | Asn | Leu | Ser | |
| | | 900 | | | | | | 905 | | | | | 910 | | | |
| Gly | Val | Asn | Gly | Ser | Pro | Gln | Ser | Ala | Leu | Asp | Phe | Ile | Arg | Arg | Glu | |
| | | 915 | | | | | 920 | | | | | 925 | | | | |
| Ser | Ser | Val | Tyr | Asp | Ile | Ser | Glu | His | Arg | Arg | Ser | Phe | Thr | His | Ser | |
| | 930 | | | | | 935 | | | | | 940 | | | | | |
| Asp | Cys | Lys | Ser | Tyr | Asn | Asn | Pro | Pro | Cys | Glu | Glu | Asn | Leu | Phe | Ser | |
| 945 | | | | | 950 | | | | | 955 | | | | | 960 | |
| Asp | Tyr | Ile | Ser | Glu | Val | Glu | Arg | Thr | Phe | Gly | Asn | Leu | Gln | Leu | Lys | |
| | | | | 965 | | | | | 970 | | | | | 975 | | |
| Asp | Ser | Asn | Val | Tyr | Gln | Asp | His | Tyr | His | His | His | His | Arg | Pro | His | |
| | | | 980 | | | | | 985 | | | | | 990 | | | |
| Ser | Ile | Gly | Ser | Ala | Ser | Ser | Ile | Asp | Gly | Leu | Tyr | Asp | Cys | Asp | Asn | |
| | | 995 | | | | | 1000 | | | | | 1005 | | | | |
| Pro | Pro | Phe | Thr | Thr | Gln | Ser | Arg | Ser | Ile | Ser | Lys | Lys | Pro | Leu | Asp | |
| | 1010 | | | | | 1015 | | | | | 1020 | | | | | |
| Ile | Gly | Leu | Pro | Ser | Ser | Lys | His | Ser | Gln | Leu | Ser | Asp | Leu | Tyr | Gly | |
| 1025 | | | | | 1030 | | | | | 1035 | | | | | 1040 | |
| Lys | Phe | Ser | Phe | Lys | Ser | Asp | Arg | Tyr | Ser | Gly | His | Asp | Asp | Leu | Ile | |
| | | | | 1045 | | | | | 1050 | | | | | 1055 | | |
| Arg | Ser | Asp | Val | Ser | Asp | Ile | Ser | Thr | His | Thr | Val | Thr | Tyr | Gly | Asn | |
| | | | 1060 | | | | | 1065 | | | | | 1070 | | | |
| Ile | Glu | Gly | Asn | Ala | Ala | Lys | Arg | Arg | Lys | Gln | Gln | Tyr | Lys | Asp | Ser | |
| | | 1075 | | | | | 1080 | | | | | 1085 | | | | |
| Leu | Lys | Lys | Arg | Pro | Ala | Ser | Ala | Lys | Ser | Arg | Arg | Glu | Phe | Asp | Glu | |
| | 1090 | | | | | 1095 | | | | | 1100 | | | | | |
| Ile | Glu | Leu | Ala | Tyr | Arg | Arg | Arg | Pro | Pro | Arg | Ser | Pro | Asp | His | Lys | |
| 1105 | | | | | 1110 | | | | | 1115 | | | | | 1120 | |
| Arg | Tyr | Phe | Arg | Asp | Lys | Glu | Gly | Leu | Arg | Asp | Phe | Tyr | Leu | Asp | Gln | |
| | | | | 1125 | | | | 1130 | | | | | 1135 | | | |
| Phe | Arg | Thr | Lys | Glu | Asn | Ser | Pro | His | Trp | Glu | His | Val | Asp | Leu | Thr | |
| | | | 1140 | | | | | 1145 | | | | | 1150 | | | |
| Asp | Ile | Tyr | Lys | Glu | Arg | Ser | Asp | Asp | Phe | Lys | Arg | Asp | Ser | Ile | Ser | |
| | | 1155 | | | | | 1160 | | | | | 1165 | | | | |
| Gly | Gly | Gly | Pro | Cys | Thr | Asn | | | | | | | | | | |

Leu Thr Asn Val Glu Trp Glu Asp Arg Ser Gly Gly Asn Phe Cys Arg
 1205 1210 1215
 Ser Cys Pro Ser Lys Leu His Asn Tyr Ser Thr Thr Val Thr Gly Gln
 1220 1225 1230
 Asn Ser Gly Arg Gln Ala Cys Ile Arg Cys Glu Ala Cys Lys Lys Ala
 1235 1240 1245
 Gly Asn Leu Tyr Asp Ile Ser Glu Asp Asn Ser Leu Gln Glu Leu Asp
 1250 1255 1260
 Gln Pro Ala Ala Pro Val Ala Val Thr Ser Asn Ala Ser Thr Thr Lys
 1265 1270 1275 1280
 Tyr Pro Gln Ser Pro Thr Asn Ser Lys Ala Gln Lys Lys Asn Arg Asn
 1285 1290 1295
 Lys Leu Arg Arg Gln His Ser Tyr Asp Thr Phe Val Asp Leu Gln Lys
 1300 1305 1310
 Glu Glu Ala Ala Leu Ala Pro Arg Ser Val Ser Leu Lys Asp Lys Gly
 1315 1320 1325
 Arg Phe Met Asp Gly Ser Pro Tyr Ala His Met Phe Glu Met Ser Ala
 1330 1335 1340
 Gly Glu Ser Thr Phe Ala Asn Asn Lys Ser Ser Val Pro Thr Ala Gly
 1345 1350 1355 1360
 His His His His Asn Asn Pro Gly Gly Gly Tyr Met Leu Ser Lys Ser
 1365 1370 1375
 Leu Tyr Pro Asp Arg Val Thr Gln Asn Pro Phe Ile Pro Thr Phe Gly
 1380 1385 1390
 Asp Asp Gln Cys Leu Leu His Gly Ser Lys Ser Tyr Phe Phe Arg Gln
 1395 1400 1405
 Pro Thr Val Ala Gly Ala Ser Lys Ala Arg Pro Asp Phe Arg Ala Leu
 1410 1415 1420
 Val Thr Asn Lys Pro Val Val Ser Ala Leu His Gly Ala Val Pro Ala
 1425 1430 1435 1440
 Arg Phe Gln Lys Asp Ile Cys Ile Gly Asn Gln Ser Asn Pro Cys Val
 1445 1450 1455
 Pro Asn Asn Thr Asn Pro Arg Ala Phe Asn Gly Ser Ser Asn Gly His
 1460 1465 1470
 Val Tyr Glu Lys Leu Ser Ser Ile Glu Ser Asp Val
 1475 1480

(2) INFORMATION FOR SEQ ID NO:15:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 4695 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: both
- (D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

10007442001

(ix) FEATURE:

(A) NAME/KEY: CDS

(B) LOCATION: 485..4495

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

| | |
|---|------|
| CGAGAACACA GCGAGTGTGT GAGTCCCTCC CGCTCCAGCT CCTCCAAGCC GCGGCCGCCG | 60 |
| CCGCCACCCT CGCCCGCAGC CTCCCGCAGC CTCCCTCGGC CACCGGTGTC TGGTGGGGGT | 120 |
| GTTGCCTGGG TAGGTCGGCC CGGCCCCAG GGGTCTCTCG AGCGTCTGCC ATCTGCCCCA | 180 |
| GAAACATGTG TGGCCACGTC CTCGCCTAGT CCAGGTGGCC GCAACCTTGG GGGAGAGACA | 240 |
| GGGCAGGACA GGACCAAGGT AAGAGGTAAG GAGGAGACGG CGCCAGGGAC AGACAGGAGG | 300 |
| TCCCGGCTTG CCGTTGTGCG CACCACCACT GCCGCCGCC CGGGGCCTGC CCCCACATC | 360 |
| GGCTCTCTGA GCCCTCCTCG GAATCTTGGG GTCGCTGGAC GCCGGGTTC GGTCTTGCC | 420 |
| CCCCCGCCAT CCCCCAACA GAACAGGGTC ATGAAAGAG GCCGCCCGGC GGGGCCCGCA | 480 |
| GGCG ATG CGC GGC GCC GGT GGC CCC CGC GGC CCT CGG GGC CCC GCT AAG | 529 |
| Met Arg Gly Ala Gly Gly Pro Arg Gly Pro Arg Gly Pro Ala Lys | |
| 1 5 10 15 | |
| ATG CTG CTG CTG CTG GCG CTG GCC TGC GCC AGC CCG TTC CCG GAG GAG | 577 |
| Met Leu Leu Leu Leu Ala Leu Ala Cys Ala Ser Pro Phe Pro Glu Glu | |
| 20 25 30 | |
| GCG CCG GGG CCG GGC GGG GCC GGT GGG CCC GGC GGC GGC CTC GGC GGG | 625 |
| Ala Pro Gly Pro Gly Gly Ala Gly Gly Pro Gly Gly Gly Leu Gly Gly | |
| 35 40 45 | |
| GCG CCG CCG CTC AAC GTG GCG CTC GTG TTC TCG GGG CCC GCG TAC GCG | 673 |
| Ala Arg Pro Leu Asn Val Ala Leu Val Phe Ser Gly Pro Ala Tyr Ala | |
| 50 55 60 | |
| GCC GAG GCG GCA CGC CTG GGC CCG GCC GTG GCG GCG GCG GTG CGC AGC | 721 |
| Ala Glu Ala Ala Arg Leu Gly Pro Ala Val Ala Ala Ala Val Arg Ser | |
| 65 70 75 | |
| CCG GGC CTA GAC GTG CGG CCC GTG GCG CTG GTG CTC AAC GGC TCG GAC | 769 |
| Pro Gly Leu Asp Val Arg Pro Val Ala Leu Val Leu Asn Gly Ser Asp | |
| 80 85 90 95 | |
| CCG CGC AGC CTC GTG CTG CAG CTC TGC GAC CTG CTG TCG GGG TTG CGC | 817 |
| Pro Arg Ser Leu Val Leu Gln Leu Cys Asp Leu Leu Ser Gly Leu Arg | |
| 100 105 110 | |
| GTG CAC GGC GTG GTC TTC GAA GAC GAC TCG CGC GCG CCC GCC GTC GCG | 865 |
| Val His Gly Val Val Phe Glu Asp Asp Ser Arg Ala Pro Ala Val Ala | |
| 115 120 125 | |
| CCC ATC CTC GAC TTC CTG TCG GCG CAG ACC TCG CTC CCC ATC GTG TCC | 913 |
| Pro Ile Leu Asp Phe Leu Ser Ala Gln Thr Ser Leu Pro Ile Val Ser | |
| 130 135 140 | |
| GAG CAC GGC GGC GCC GCG CTC GTG CTC ACG CCC AAG GAG AAG GGC TCC | 961 |
| Glu His Gly Gly Ala Ala Leu Val Leu Thr Pro Lys Glu Lys Gly Ser | |
| 145 150 155 | |
| ACC TTC CTC CAC CTG GGC TCT TCC CCC GAG CAA CAG CTT CAG GTC ATC | 1009 |
| Thr Phe Leu His Leu Gly Ser Ser Pro Glu Gln Gln Leu Gln Val Ile | |
| 160 165 170 175 | |

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| | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| TTT | GAG | GTG | CTG | GAG | GAG | TAT | GAC | TGG | ACG | TCC | TTT | GTA | GCC | GTG | ACC | 1057 |
| Phe | Glu | Val | Leu | Glu | Glu | Tyr | Asp | Trp | Thr | Ser | Phe | Val | Ala | Val | Thr | |
| | | | 180 | | | | | | 185 | | | | | 190 | | |
| ACT | CGT | GCC | CCT | GGC | CAC | CGG | GCC | TTC | CTG | TCC | TAC | ATT | GAG | GTG | CTG | 1105 |
| Thr | Arg | Ala | Pro | Gly | His | Arg | Ala | Phe | Leu | Ser | Tyr | Ile | Glu | Val | Leu | |
| | | | 195 | | | | | 200 | | | | | 205 | | | |
| ACT | GAC | GGC | AGT | CTG | GTG | GGC | TGG | GAG | CAC | CGC | GGA | GCG | CTG | ACG | CTG | 1153 |
| Thr | Asp | Gly | Ser | Leu | Val | Gly | Trp | Glu | His | Arg | Gly | Ala | Leu | Thr | Leu | |
| | | 210 | | | | | 215 | | | | | 220 | | | | |
| GAC | CCT | GGG | GCG | GGC | GAG | GCC | GTG | CTC | AGT | GCC | CAG | CTC | CGC | AGT | GTC | 1201 |
| Asp | Pro | Gly | Ala | Gly | Glu | Ala | Val | Leu | Ser | Ala | Gln | Leu | Arg | Ser | Val | |
| | 225 | | | | | 230 | | | | | 235 | | | | | |
| AGC | GCG | CAG | ATC | CGC | CTG | CTC | TTC | TGC | GCC | CGA | GAG | GAG | GCC | GAG | CCC | 1249 |
| Ser | Ala | Gln | Ile | Arg | Leu | Leu | Phe | Cys | Ala | Arg | Glu | Glu | Ala | Glu | Pro | |
| | 240 | | | | 245 | | | | | 250 | | | | | 255 | |
| GTG | TTC | CGC | GCA | GCT | GAG | GAG | GCT | GGC | CTC | ACT | GGA | TCT | GGC | TAC | GTC | 1297 |
| Val | Phe | Arg | Ala | Ala | Glu | Glu | Ala | Gly | Leu | Thr | Gly | Ser | Gly | Tyr | Val | |
| | | | 260 | | | | | | 265 | | | | | 270 | | |
| TGG | TTC | ATG | GTG | GGG | CCC | CAG | CTG | GCT | GGA | GGC | GGG | GGC | TCT | GGG | GCC | 1345 |
| Trp | Phe | Met | Val | Gly | Pro | Gln | Leu | Ala | Gly | Gly | Gly | Gly | Ser | Gly | Ala | |
| | | | 275 | | | | | 280 | | | | | 285 | | | |
| CCT | GGT | GAG | CCC | CCT | CTT | CTG | CCA | GGA | GGC | GCC | CCC | CTG | CCT | GCC | GGG | 1393 |
| Pro | Gly | Glu | Pro | Pro | Leu | Leu | Pro | Gly | Gly | Ala | Pro | Leu | Pro | Ala | Gly | |
| | | 290 | | | | | 295 | | | | | 300 | | | | |
| CTG | TTT | GCA | GTG | CGC | TCG | GCT | GGC | TGG | CGG | GAT | GAC | CTG | GCT | CGG | CGA | 1441 |
| Leu | Phe | Ala | Val | Arg | Ser | Ala | Gly | Trp | Arg | Asp | Asp | Leu | Ala | Arg | Arg | |
| | 305 | | | | | 310 | | | | | 315 | | | | | |
| GTG | GCA | GCT | GGC | GTG | GCC | GTA | GTG | GCC | AGA | GGT | GCC | CAG | GCC | CTG | CTG | 1489 |
| Val | Ala | Ala | Gly | Val | Ala | Val | Val | Ala | Arg | Gly | Ala | Gln | Ala | Leu | Leu | |
| | 320 | | | | 325 | | | | | 330 | | | | 335 | | |
| CGT | GAT | TAT | GGT | TTC | CTT | CCT | GAG | CTC | GGC | CAC | GAC | TGT | CGC | GCC | CAG | 1537 |
| Arg | Asp | Tyr | Gly | Phe | Leu | Pro | Glu | Leu | Gly | His | Asp | Cys | Arg | Ala | Gln | |
| | | | 340 | | | | | | 345 | | | | | 350 | | |
| AAC | CGC | ACC | CAC | CGC | GGG | GAG | AGT | CTG | CAT | AGG | TAC | TTC | ATG | AAC | ATC | 1585 |
| Asn | Arg | Thr | His | Arg | Gly | Glu | Ser | Leu | His | Arg | Tyr | Phe | Met | Asn | Ile | |
| | | | 355 | | | | | 360 | | | | | 365 | | | |
| ACG | TGG | GAT | AAC | CGG | GAT | TAC | TCC | TTC | AAT | GAG | GAC | GGC | TTC | CTA | GTG | 1633 |
| Thr | Trp | Asp | Asn | Arg | Asp | Tyr | Ser | Phe | Asn | Glu | Asp | Gly | Phe | Leu | Val | |
| | | 370 | | | | | 375 | | | | | 380 | | | | |
| AAC | CCC | TCC | CTG | GTG | GTC | ATC | TCC | CTC | ACC | AGA | GAC | AGG | ACG | TGG | GAG | 1681 |
| Asn | Pro | Ser | Leu | Val | Val | Ile | Ser | Leu | Thr | Arg | Asp | Arg | Thr | Trp | Glu | |
| | 385 | | | | | 390 | | | | | 395 | | | | | |
| GTG | GTG | GGC | AGC | TGG | GAG | CAG | CAG | ACG | CTC | CGC | CTC | AAG | TAC | CCG | CTG | 1729 |
| Val | Val | Gly | Ser | Trp | Glu | Gln | Gln | Thr | Leu | Arg | Leu | Lys | Tyr | Pro | Leu | |
| | 400 | | | | 405 | | | | | 410 | | | | 415 | | |
| TGG | TCC | CGC | TAT | GGT | CGC | TTC | CTG | CAG | CCA | GTG | GAC | GAC | ACG | CAG | CAC | 1777 |
| Trp | Ser | Arg | Tyr | Gly | Arg | Phe | Leu | Gln | Pro | Val | Asp | Asp | Thr | Gln | His | |
| | | | 420 | | | | | 425 | | | | | | 430 | | |
| CTC | GCG | GTG | GCC | ACG | CTG | GAG | GAA | AGG | CCG | TTT | GTC | ATC | GTG | GAG | CCT | 1825 |
| Leu | Ala | Val | Ala | Thr | Leu | Glu | Glu | Arg | Pro | Phe | Val | Ile | Val | Glu | Pro | |
| | | | 435 | | | | | 440 | | | | | 445 | | | |

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|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|
| GCA | GAC | CCT | ATC | AGC | GGC | ACC | TGC | ATC | CGA | GAC | TCC | GTC | CCC | TGC | CGG | 1873 |
| Ala | Asp | Pro | Ile | Ser | Gly | Thr | Cys | Ile | Arg | Asp | Ser | Val | Pro | Cys | Arg | |
| | | 450 | | | | | 455 | | | | | 460 | | | | |
| AGC | CAG | CTC | AAC | CGA | ACC | CAC | AGC | CCT | CCA | CCG | GAT | GCC | CCC | CGC | CCG | 1921 |
| Ser | Gln | Leu | Asn | Arg | Thr | His | Ser | Pro | Pro | Pro | Asp | Ala | Pro | Arg | Pro | |
| | 465 | | | | | 470 | | | | | 475 | | | | | |
| GAA | AAG | CGC | TGC | TGC | AAG | GGT | TTC | TGC | ATC | GAC | ATT | CTG | AAG | CGG | CTG | 1969 |
| Glu | Lys | Arg | Cys | Cys | Lys | Gly | Phe | Cys | Ile | Asp | Ile | Leu | Lys | Arg | Leu | |
| 480 | | | | | 485 | | | | | 490 | | | | | 495 | |
| GCG | CAT | ACC | ATC | GGC | TTC | AGC | TAC | GAC | CTC | TAC | CTG | GTC | ACC | AAT | GGC | 2017 |
| Ala | His | Thr | Ile | Gly | Phe | Ser | Tyr | Asp | Leu | Tyr | Leu | Val | Thr | Asn | Gly | |
| | | | | 500 | | | | | 505 | | | | | 510 | | |
| AAG | CAC | GGA | AAG | AAG | ATC | GAT | GGC | GTC | TGG | AAC | GGC | ATG | ATC | GGG | GAG | 2065 |
| Lys | His | Gly | Lys | Lys | Ile | Asp | Gly | Val | Trp | Asn | Gly | Met | Ile | Gly | Glu | |
| | | | 515 | | | | | 520 | | | | | 525 | | | |
| GTG | TTC | TAC | CAG | CGC | GCA | GAC | ATG | GCC | ATC | GGC | TCC | CTC | ACC | ATC | AAC | 2113 |
| Val | Phe | Tyr | Gln | Arg | Ala | Asp | Met | Ala | Ile | Gly | Ser | Leu | Thr | Ile | Asn | |
| | | 530 | | | | | 535 | | | | | 540 | | | | |
| GAG | GAG | CGC | TCC | GAG | ATC | GTG | GAC | TTC | TCC | GTC | CCC | TTC | GTG | GAG | ACC | 2161 |
| Glu | Glu | Arg | Ser | Glu | Ile | Val | Asp | Phe | Ser | Val | Pro | Phe | Val | Glu | Thr | |
| | 545 | | | | | 550 | | | | | 555 | | | | | |
| GGC | ATC | AGC | GTC | ATG | GTG | GCG | CGC | AGC | AAT | GGC | ACG | GTG | TCC | CCC | TCG | 2209 |
| Gly | Ile | Ser | Val | Met | Val | Ala | Arg | Ser | Asn | Gly | Thr | Val | Ser | Pro | Ser | |
| 560 | | | | | 565 | | | | | 570 | | | | | 575 | |
| GCC | TTC | CTC | GAG | CCC | TAC | AGC | CCC | GCC | GTG | TGG | GTG | ATG | ATG | TTC | GTC | 2257 |
| Ala | Phe | Leu | Glu | Pro | Tyr | Ser | Pro | Ala | Val | Trp | Val | Met | Met | Phe | Val | |
| | | | | 580 | | | | | 585 | | | | | 590 | | |
| ATG | TGC | CTC | ACT | GTG | GTC | GCC | GTC | ACT | GTT | TTC | ATC | TTC | GAG | TAC | CTC | 2305 |
| Met | Cys | Leu | Thr | Val | Val | Ala | Val | Thr | Val | Phe | Ile | Phe | Glu | Tyr | Leu | |
| | | | 595 | | | | | 600 | | | | | 605 | | | |
| AGT | CCT | GTT | GGT | TAC | AAC | CGC | AGC | CTG | GCC | ACG | GGC | AAG | CGC | CCT | GGC | 2353 |
| Ser | Pro | Val | Gly | Tyr | Asn | Arg | Ser | Leu | Ala | Thr | Gly | Lys | Arg | Pro | Gly | |
| | | 610 | | | | | 615 | | | | | 620 | | | | |
| GGT | TCA | ACC | TTC | ACC | ATT | GGG | AAA | TCC | ATC | TGG | CTG | CTC | TGG | GCC | CTG | 2401 |
| Gly | Ser | Thr | Phe | Thr | Ile | Gly | Lys | Ser | Ile | Trp | Leu | Leu | Trp | Ala | Leu | |
| | 625 | | | | | 630 | | | | | 635 | | | | | |
| GTG | TTC | AAT | AAT | TCG | GTG | CCC | GTG | GAG | AAC | CCC | CGG | GGA | ACC | ACC | AGC | 2449 |
| Val | Phe | Asn | Asn | Ser | Val | Pro | Val | Glu | Asn | Pro | Arg | Gly | Thr | Thr | Ser | |
| 640 | | | | | 645 | | | | | 650 | | | | | 655 | |
| AAA | ATC | ATG | GTG | CTG | GTG | TGG | GCC | TTC | TTC | GCC | GTC | ATC | TTC | CTC | GCC | 2497 |
| Lys | Ile | Met | Val | Leu | Val | Trp | Ala | Phe | Phe | Ala | Val | Ile | Phe | Leu | Ala | |
| | | | | 660 | | | | | 665 | | | | | 670 | | |
| AGC | TAC | ACA | GCC | AAC | CTG | GCC | GCC | TTC | ATG | ATC | CAG | GAG | GAG | TAC | GTG | 2545 |
| Ser | Tyr | Thr | Ala | Asn | Leu | Ala | Ala | Phe | Met | Ile | Gln | Glu | Glu | Tyr | Val | |
| | | | 675 | | | | | 680 | | | | | 685 | | | |
| GAT | ACT | GTG | TCT | GGG | CTC | AGT | GAC | CGC | AAG | TTC | CAG | AGG | CCC | CAG | GAG | 2593 |
| Asp | Thr | Val | Ser | Gly | Leu | Ser | Asp | Arg | Lys | Phe | Gln | Arg | Pro | Gln | Glu | |
| | | 690 | | | | | 695 | | | | | 700 | | | | |
| CAG | TAC | CCG | CCC | CTG | AAG | TTT | GGG | ACC | GTG | CCC | AAC | GGC | TCC | ACG | GAG | 2641 |
| Gln | Tyr | Pro | Pro | Leu | Lys | Phe | Gly | Thr | Val | Pro | Asn | Gly | Ser | Thr | Glu | |
| | 705 | | | | | 710 | | | | | 715 | | | | | |

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|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------|-------------------|-------------------|------|
| AAG Lys 720 | AAC Asn | ATC Ile | CGC Arg | AGC Ser | AAC Asn 725 | TAT Tyr | CCC Pro | GAC Asp | ATG Met | CAC His 730 | AGC Ser | TAC Tyr | ATG Met | GTG Val | CGC Arg 735 | 2689 |
| TAC Tyr | AAC Asn | CAG Gln | CCC Pro | CGC Arg 740 | GTA Val | GAG Glu | GAA Glu | GCG Ala | CTC Leu 745 | ACT Thr | CAG Gln | CTC Leu | AAG Lys | GCA Ala 750 | GGG Gly | 2737 |
| AAG Lys | CTG Leu | GAC Asp | GCC Ala 755 | TTC Phe | ATC Ile | TAC Tyr | GAT Asp | GCT Ala 760 | GCA Ala | GTG Val | CTC Leu | AAT Asn 765 | TAC Tyr | ATG Met | GCC Ala | 2785 |
| CGC Arg | AAG Lys | GAC Asp 770 | GAG Glu | GGC Gly | TGC Cys | AAG Lys | CTT Leu 775 | GTC Val | ACC Thr | ATC Ile | GGC Gly 780 | TCC Ser | GGC Gly | AAG Lys | GTC Val | 2833 |
| TTC Phe 785 | GCC Ala | ACG Thr | ACA Thr | GGC Gly | TAT Tyr | GGC Gly 790 | ATC Ile | GCC Ala | CTG Leu | CAC His | AAG Lys 795 | GGC Gly | TCC Ser | CGC Arg | TGG Trp | 2881 |
| AAG Lys 800 | CGG Arg | CCC Pro | ATC Ile | GAC Asp 805 | CTG Leu | GCG Ala | TTG Leu | CTG Leu | CAG Gln | TTC Phe 810 | CTG Leu | GGG Gly | GAT Asp | GAT Asp | GAG Glu 815 | 2929 |
| ATC Ile | GAG Glu | ATG Met | CTG Leu | GAG Glu 820 | CGG Arg | CTG Leu | TGG Trp | CTC Leu | TCT Ser 825 | GGG Gly | ATC Ile | TGC Cys | CAC His | AAT Asn 830 | GAC Asp | 2977 |
| AAA Lys | ATC Ile | GAG Glu | GTG Val 835 | ATG Met | AGC Ser | AGC Ser | AAG Lys | CTG Leu 840 | GAC Asp | ATC Ile | GAC Asp | AAC Asn | ATG Met | GCG Ala | GGC Gly | 3025 |
| GTC Val | TTC Phe 850 | TAC Tyr | ATG Met | CTC Leu | CTG Leu | GTG Val | GCC Ala 855 | ATG Met | GGC Gly | CTG Leu | TCC Ser | CTG Leu | CTG Leu | GTC Val | TTC Phe | 3073 |
| GCC Ala 865 | TGG Trp | GAG Glu | CAC His | CTG Leu | GTG Val | TAC Tyr 870 | TGG Trp | CGC Arg | CTG Leu | CGG Arg | CAC His 875 | TGC Cys | CTG Leu | GGG Gly | CCC Pro | 3121 |
| ACC Thr 880 | CAC His | CGC Arg | ATG Met | GAC Asp 885 | TTC Phe | CTG Leu | CTG Leu | GCC Ala | TTC Phe | TCC Ser 890 | AGG Arg | GGC Gly | ATG Met | TAC Tyr | AGC Ser 895 | 3169 |
| TGC Cys | TGC Cys | AGC Ser | GCT Ala | GAG Glu 900 | GCC Ala | GCC Ala | CCA Pro | CCG Pro | CCC Pro 905 | GCC Ala | AAG Lys | CCC Pro | CCG Pro | CCG Pro 910 | CCG Pro | 3217 |
| CCA Pro | CAG Gln | CCC Pro | CTG Leu 915 | CCC Pro | AGC Ser | CCC Pro | GCG Ala | TAC Tyr 920 | CCC Pro | GCG Ala | CCG Pro | GGG Gly | CCG Pro | GCT Ala | CCC Pro | 3265 |
| GGG Gly | CCC Pro | GCA Ala 930 | CCT Pro | TTC Phe | GTC Val | CCC Pro | CGC Arg | GAG Glu | CGC Arg | GCC Ala | TCA Ser | GTG Val 940 | GCC Ala | CGC Arg | TGG Trp | 3313 |
| CGC Arg 945 | CGG Arg | CCC Pro | AAG Lys | GGC Gly | GCG Ala | GGG Gly 950 | CCG Pro | CCG Pro | GGG Gly | GGC Gly | GCG Ala 955 | GGC Gly | CTG Leu | GCC Ala | GAC Asp | 3361 |
| GGC Gly 960 | TTC Phe | CAC His | CGC Arg | TAC Tyr | TAC Tyr 965 | GGC Gly | CCC Pro | ATC Ile | GAG Glu | CCG Pro 970 | CAG Gln | GGC Gly | CTA Leu | GGC Gly | CTC Leu 975 | 3409 |
| GGC Gly | CTG Leu | GGC Gly | GAA Glu | GCG Ala 980 | CGC Arg | GCG Ala | GCA Ala | CCG Pro | CGG Arg 985 | GGC Gly | GCA Ala | GCC Ala | GGG Gly | CGC Arg | CCG Pro 990 | 3457 |

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|---|------|
| CTG TCC CCG CCG GCC GCT CAG CCC CCG CAG AAG CCG CCG GCC TCC TAT Leu Ser Pro Pro Ala Ala Gln Pro Pro Gln Lys Pro Pro Ala Ser Tyr 995 1000 1005 | 3505 |
| TTC GCC ATC GTA CGC GAC AAG GAG CCA GCC GAG CCC CCC GCC GGC GCC Phe Ala Ile Val Arg Asp Lys Glu Pro Ala Glu Pro Pro Ala Gly Ala 1010 1015 1020 | 3553 |
| TTC CCC GGC TTC CCG TCC CCG CCC GCG CCC CCC GCC GCC GCG GCC ACC Phe Pro Gly Phe Pro Ser Pro Pro Ala Pro Pro Ala Ala Ala Thr 1025 1030 1035 | 3601 |
| GCC GTC GGG CCG CCA CTC TGC CGC TTG GCC TTC GAG GAC GAG AGC CCG Ala Val Gly Pro Pro Leu Cys Arg Leu Ala Phe Glu Asp Glu Ser Pro 1040 1045 1050 1055 | 3649 |
| CCG GCG CCC GCG CGG TGG CCG CGC TCG GAC CCC GAG AGC CAA CCC CTG Pro Ala Pro Ala Arg Trp Pro Arg Ser Asp Pro Glu Ser Gln Pro Leu 1060 1065 1070 | 3697 |
| CTG GGG CCA GGC GCG GGC GGC GCG GGG GGC ACG GGG GGC GCA GGC GGA Leu Gly Pro Gly Ala Gly Gly Ala Gly Gly Thr Gly Gly Ala Gly Gly 1075 1080 1085 | 3745 |
| GGA GCC CCG GCC GCT CCG CCC CCG TGC TTC GCC GCG CCG CCC CCG TGC Gly Ala Pro Ala Ala Pro Pro Pro Cys Phe Ala Ala Pro Pro Pro Cys 1090 1095 1100 | 3793 |
| TTT TAC CTC GAT GTC GAC CAG TCG CCG TCG GAC TCG GAG GAC TCG GAG Phe Tyr Leu Asp Val Asp Gln Ser Pro Ser Asp Ser Glu Asp Ser Glu 1105 1110 1115 | 3841 |
| AGC CTG GCC GGC GCG TCC CTG GCC GGC CTG GAT CCC TGG TGG TTC GCC Ser Leu Ala Gly Ala Ser Leu Ala Gly Leu Asp Pro Trp Trp Phe Ala 1120 1125 1130 1135 | 3889 |
| GAC TTC CCT TAC CCG TAT GCC GAT CGC CTC GGG CSG CCC GCG GCA CGC Asp Phe Pro Tyr Pro Tyr Ala Asp Arg Leu Gly Xaa Pro Ala Ala Arg 1140 1145 1150 | 3937 |
| TAC GGA TTG GTC GAC AAA CTA GGG GGC TGG CTC GCC GGG AGC TGG GAC Tyr Gly Leu Val Asp Lys Leu Gly Gly Trp Leu Ala Gly Ser Trp Asp 1155 1160 1165 | 3985 |
| TAC CTG CCT CCS CGC AGC GGT CGG GCC GCC TGG CAC TGT CGG CAC TGC Tyr Leu Pro Xaa Arg Ser Gly Arg Ala Ala Trp His Cys Arg His Cys 1170 1175 1180 | 4033 |
| GCC AGC CTG GAG CTG CTT CCG CCG CCG CGC CAT CTC AGC TGC TCG CAC Ala Ser Leu Glu Leu Leu Pro Pro Pro Arg His Leu Ser Cys Ser His 1185 1190 1195 | 4081 |
| GAT GGC CTG GAC GGC GGC TGG TGG GCG CCA CCG CCT CCA CCC TGG GCC Asp Gly Leu Asp Gly Gly Trp Trp Ala Pro Pro Pro Pro Pro Trp Ala 1200 1205 1210 1215 | 4129 |
| GCC GGG CCC CTG CCC CGA CGC CGG GCC CGC TGC GGG TGC CCG CGG TCG Ala Gly Pro Leu Pro Arg Arg Arg Ala Arg Cys Gly Cys Pro Arg Ser 1220 1225 1230 | 4177 |
| CAC CCG CAC CGC CCG CGG GCC TCG CAC CGC ACG CCC GCC GCT GCC GCG His Pro His Arg Pro Arg Ala Ser His Arg Thr Pro Ala Ala Ala Ala 1235 1240 1245 | 4225 |
| CCC CAC CAC CAC AGG CAC CGG CGC GCC GCT GGG GGC TGG GAC CTC CCG Pro His His His Arg His Arg Arg Ala Ala Gly Gly Trp Asp Leu Pro 1250 1255 1260 | 4273 |

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|---|------|
| CCG CCC GCG CCC ACC TCG CGC TCG CTC GAG GAC CTC AGC TCG TGC CCT | 4321 |
| Pro Pro Ala Pro Thr Ser Arg Ser Leu Glu Asp Leu Ser Ser Cys Pro | |
| 1265 1270 1275 | |
| CGC GCC GCC CCT GCG CGC AGG CTT ACC GGG CCC TCC CGC CAC GCT CGC | 4369 |
| Arg Ala Ala Pro Ala Arg Arg Leu Thr Gly Pro Ser Arg His Ala Arg | |
| 1280 1285 1290 1295 | |
| AGG TGT CCG CAC GCC GCG CAC TGG GGG CCG CCG CTG CCT ACA GCT TCC | 4417 |
| Arg Cys Pro His Ala Ala His Trp Gly Pro Pro Leu Pro Thr Ala Ser | |
| 1300 1305 1310 | |
| CAC CGG AGA CAC CGG GGC GGG GAC CTG GGC ACC CGC AGG GGC TCG GCG | 4465 |
| His Arg Arg His Arg Gly Gly Asp Leu Gly Thr Arg Arg Gly Ser Ala | |
| 1315 1320 1325 | |
| CAC TTC TCT AGC CTC GAG TCC GAG GTA TGACGCGGCC CCGGGGGGCC | 4512 |
| His Phe Ser Ser Leu Glu Ser Glu Val | |
| 1330 1335 | |
| CACCGCCCCC TTGGTCAGCG CAGGCCACGG CCCGAGGGGG CGCCCGCAGT GGACAGGACC | 4572 |
| CGCGTGGGTT GGAAGGAAA GCAGTGAAC TGGCCGGACC CCGCCTGGAG CAGCGTCCTG | 4632 |
| CGCCCCCTGG TTCTGGAGGA ACCGCAAGCC GGAGAGGATT TGGTCCCTCA ACTATCACCC | 4692 |
| AGG | 4695 |

(2) INFORMATION FOR SEQ ID NO:16:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 1336 amino acids
- (B) TYPE: amino acid
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

| | |
|---|--|
| Met Arg Gly Ala Gly Gly Pro Arg Gly Pro Arg Gly Pro Ala Lys Met | |
| 1 5 10 15 | |
| Leu Leu Leu Leu Ala Leu Ala Cys Ala Ser Pro Phe Pro Glu Glu Ala | |
| 20 25 30 | |
| Pro Gly Pro Gly Gly Ala Gly Gly Pro Gly Gly Gly Leu Gly Gly Ala | |
| 35 40 45 | |
| Arg Pro Leu Asn Val Ala Leu Val Phe Ser Gly Pro Ala Tyr Ala Ala | |
| 50 55 60 | |
| Glu Ala Ala Arg Leu Gly Pro Ala Val Ala Ala Val Arg Ser Pro | |
| 65 70 75 80 | |
| Gly Leu Asp Val Arg Pro Val Ala Leu Val Leu Asn Gly Ser Asp Pro | |
| 85 90 95 | |
| Arg Ser Leu Val Leu Gln Leu Cys Asp Leu Leu Ser Gly Leu Arg Val | |
| 100 105 110 | |
| His Gly Val Val Phe Glu Asp Asp Ser Arg Ala Pro Ala Val Ala Pro | |
| 115 120 125 | |
| Ile Leu Asp Phe Leu Ser Ala Gln Thr Ser Leu Pro Ile Val Ser Glu | |
| 130 135 140 | |

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His Gly Gly Ala Ala Leu Val Leu Thr Pro Lys Glu Lys Gly Ser Thr
 145 150 155 160
 Phe Leu His Leu Gly Ser Ser Pro Glu Gln Gln Leu Gln Val Ile Phe
 165 170 175
 Glu Val Leu Glu Glu Tyr Asp Trp Thr Ser Phe Val Ala Val Thr Thr
 180 185 190
 Arg Ala Pro Gly His Arg Ala Phe Leu Ser Tyr Ile Glu Val Leu Thr
 195 200 205
 Asp Gly Ser Leu Val Gly Trp Glu His Arg Gly Ala Leu Thr Leu Asp
 210 215 220
 Pro Gly Ala Gly Glu Ala Val Leu Ser Ala Gln Leu Arg Ser Val Ser
 225 230 235 240
 Ala Gln Ile Arg Leu Leu Phe Cys Ala Arg Glu Glu Ala Glu Pro Val
 245 250 255
 Phe Arg Ala Ala Glu Glu Ala Gly Leu Thr Gly Ser Gly Tyr Val Trp
 260 265 270
 Phe Met Val Gly Pro Gln Leu Ala Gly Gly Gly Gly Ser Gly Ala Pro
 275 280 285
 Gly Glu Pro Pro Leu Leu Pro Gly Gly Ala Pro Leu Pro Ala Gly Leu
 290 295 300
 Phe Ala Val Arg Ser Ala Gly Trp Arg Asp Asp Leu Ala Arg Arg Val
 305 310 315 320
 Ala Ala Gly Val Ala Val Val Ala Arg Gly Ala Gln Ala Leu Leu Arg
 325 330 335
 Asp Tyr Gly Phe Leu Pro Glu Leu Gly His Asp Cys Arg Ala Gln Asn
 340 345 350
 Arg Thr His Arg Gly Glu Ser Leu His Arg Tyr Phe Met Asn Ile Thr
 355 360 365
 Trp Asp Asn Arg Asp Tyr Ser Phe Asn Glu Asp Gly Phe Leu Val Asn
 370 375 380
 Pro Ser Leu Val Val Ile Ser Leu Thr Arg Asp Arg Thr Trp Glu Val
 385 390 395 400
 Val Gly Ser Trp Glu Gln Gln Thr Leu Arg Leu Lys Tyr Pro Leu Trp
 405 410 415
 Ser Arg Tyr Gly Arg Phe Leu Gln Pro Val Asp Asp Thr Gln His Leu
 420 425 430
 Ala Val Ala Thr Leu Glu Glu Arg Pro Phe Val Ile Val Glu Pro Ala
 435 440 445
 Asp Pro Ile Ser Gly Thr Cys Ile Arg Asp Ser Val Pro Cys Arg Ser
 450 455 460
 Gln Leu Asn Arg Thr His Ser Pro Pro Pro Asp Ala Pro Arg Pro Glu
 465 470 475 480
 Lys Arg Cys Cys Lys Gly Phe Cys Ile Asp Ile Leu Lys Arg Leu Ala
 485 490 495

His Thr Ile Gly Phe Ser Tyr Asp Leu Tyr Leu Val Thr Asn Gly Lys
 500 505 510
 His Gly Lys Lys Ile Asp Gly Val Trp Asn Gly Met Ile Gly Glu Val
 515 520 525
 Phe Tyr Gln Arg Ala Asp Met Ala Ile Gly Ser Leu Thr Ile Asn Glu
 530 535 540
 Glu Arg Ser Glu Ile Val Asp Phe Ser Val Pro Phe Val Glu Thr Gly
 545 550 555 560
 Ile Ser Val Met Val Ala Arg Ser Asn Gly Thr Val Ser Pro Ser Ala
 565 570 575
 Phe Leu Glu Pro Tyr Ser Pro Ala Val Trp Val Met Met Phe Val Met
 580 585 590
 Cys Leu Thr Val Val Ala Val Thr Val Phe Ile Phe Glu Tyr Leu Ser
 595 600 605
 Pro Val Gly Tyr Asn Arg Ser Leu Ala Thr Gly Lys Arg Pro Gly Gly
 610 615 620
 Ser Thr Phe Thr Ile Gly Lys Ser Ile Trp Leu Leu Trp Ala Leu Val
 625 630 635 640
 Phe Asn Asn Ser Val Pro Val Glu Asn Pro Arg Gly Thr Thr Ser Lys
 645 650 655
 Ile Met Val Leu Val Trp Ala Phe Phe Ala Val Ile Phe Leu Ala Ser
 660 665 670
 Tyr Thr Ala Asn Leu Ala Ala Phe Met Ile Gln Glu Glu Tyr Val Asp
 675 680 685
 Thr Val Ser Gly Leu Ser Asp Arg Lys Phe Gln Arg Pro Gln Glu Gln
 690 695 700
 Tyr Pro Pro Leu Lys Phe Gly Thr Val Pro Asn Gly Ser Thr Glu Lys
 705 710 715 720
 Asn Ile Arg Ser Asn Tyr Pro Asp Met His Ser Tyr Met Val Arg Tyr
 725 730 735
 Asn Gln Pro Arg Val Glu Glu Ala Leu Thr Gln Leu Lys Ala Gly Lys
 740 745 750
 Leu Asp Ala Phe Ile Tyr Asp Ala Ala Val Leu Asn Tyr Met Ala Arg
 755 760 765
 Lys Asp Glu Gly Cys Lys Leu Val Thr Ile Gly Ser Gly Lys Val Phe
 770 775 780
 Ala Thr Thr Gly Tyr Gly Ile Ala Leu His Lys Gly Ser Arg Trp Lys
 785 790 795 800
 Arg Pro Ile Asp Leu Ala Leu Leu Gln Phe Leu Gly Asp Asp Glu Ile
 805 810 815
 Glu Met Leu Glu Arg Leu Trp Leu Ser Gly Ile Cys His Asn Asp Lys
 820 825 830
 Ile Glu Val Met Ser Ser Lys Leu Asp Ile Asp Asn Met Ala Gly Val
 835 840 845

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Phe Tyr Met Leu Leu Val Ala Met Gly Leu Ser Leu Leu Val Phe Ala
 850 855 860
 Trp Glu His Leu Val Tyr Trp Arg Leu Arg His Cys Leu Gly Pro Thr
 865 870 875 880
 His Arg Met Asp Phe Leu Leu Ala Phe Ser Arg Gly Met Tyr Ser Cys
 885 890 895
 Cys Ser Ala Glu Ala Ala Pro Pro Pro Ala Lys Pro Pro Pro Pro Pro
 900 905 910
 Gln Pro Leu Pro Ser Pro Ala Tyr Pro Ala Pro Gly Pro Ala Pro Gly
 915 920 925
 Pro Ala Pro Phe Val Pro Arg Glu Arg Ala Ser Val Ala Arg Trp Arg
 930 935 940
 Arg Pro Lys Gly Ala Gly Pro Pro Gly Gly Ala Gly Leu Ala Asp Gly
 945 950 955 960
 Phe His Arg Tyr Tyr Gly Pro Ile Glu Pro Gln Gly Leu Gly Leu Gly
 965 970 975
 Leu Gly Glu Ala Arg Ala Ala Pro Arg Gly Ala Ala Gly Arg Pro Leu
 980 985 990
 Ser Pro Pro Ala Ala Gln Pro Pro Gln Lys Pro Pro Ala Ser Tyr Phe
 995 1000 1005
 Ala Ile Val Arg Asp Lys Glu Pro Ala Glu Pro Pro Ala Gly Ala Phe
 1010 1015 1020
 Pro Gly Phe Pro Ser Pro Pro Ala Pro Pro Ala Ala Ala Ala Thr Ala
 1025 1030 1035 1040
 Val Gly Pro Pro Leu Cys Arg Leu Ala Phe Glu Asp Glu Ser Pro Pro
 1045 1050 1055
 Ala Pro Ala Arg Trp Pro Arg Ser Asp Pro Glu Ser Gln Pro Leu Leu
 1060 1065 1070
 Gly Pro Gly Ala Gly Gly Ala Gly Gly Thr Gly Gly Ala Gly Gly Gly
 1075 1080 1085
 Ala Pro Ala Ala Pro Pro Pro Cys Phe Ala Ala Pro Pro Pro Cys Phe
 1090 1095 1100
 Tyr Leu Asp Val Asp Gln Ser Pro Ser Asp Ser Glu Asp Ser Glu Ser
 1105 1110 1115 1120
 Leu Ala Gly Ala Ser Leu Ala Gly Leu Asp Pro Trp Trp Phe Ala Asp
 1125 1130 1135
 Phe Pro Tyr Pro Tyr Ala Asp Arg Leu Gly Xaa Pro Ala Ala Arg Tyr
 1140 1145 1150
 Gly Leu Val Asp Lys Leu Gly Gly Trp Leu Ala Gly Ser Trp Asp Tyr
 1155 1160 1165
 Leu Pro Xaa Arg Ser Gly Arg Ala Ala Trp His Cys Arg His Cys Ala
 1170 1175 1180
 Ser Leu Glu Leu Leu Pro Pro Pro Arg His Leu Ser Cys Ser His Asp
 1185 1190 1195 1200

10007747
 120701

Gly Leu Asp Gly Gly Trp Trp Ala Pro Pro Pro Pro Pro Trp Ala Ala
1205 1210 1215

Gly Pro Leu Pro Arg Arg Arg Ala Arg Cys Gly Cys Pro Arg Ser His
1220 1225 1230

Pro His Arg Pro Arg Ala Ser His Arg Thr Pro Ala Ala Ala Ala Pro
1235 1240 1245

His His His Arg His Arg Arg Ala Ala Gly Gly Trp Asp Leu Pro Pro
1250 1255 1260

Pro Ala Pro Thr Ser Arg Ser Leu Glu Asp Leu Ser Ser Cys Pro Arg
1265 1270 1275 1280

Ala Ala Pro Ala Arg Arg Leu Thr Gly Pro Ser Arg His Ala Arg Arg
1285 1290 1295

Cys Pro His Ala Ala His Trp Gly Pro Pro Leu Pro Thr Ala Ser His
1300 1305 1310

Arg Arg His Arg Gly Gly Asp Leu Gly Thr Arg Arg Gly Ser Ala His
1315 1320 1325

Phe Ser Ser Leu Glu Ser Glu Val
1330 1335

(2) INFORMATION FOR SEQ ID NO:17:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 71 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: both
(D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

GGGTGGCGGC CGCAGAGCAC CTCCACCATC TCCTGTCTCT ACTCCAAGAT CTGGCCCTAG 60
TCCATGTTTG C 71

(2) INFORMATION FOR SEQ ID NO:18:

- (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 71 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: both
(D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:18:

TGGTGGTCCC CAACCTGTAG GACTTGGTTC TGGAGGAGGA TCTGGTGTAG GCAAACATGG 60
ACTAGGGCCA G 71

10007747 120701

(2) INFORMATION FOR SEQ ID NO:19:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 61 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: both
 (D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

GTTGGGGACC ACCAGATGGA GGTAGAGCTG CACTTGTACG AAGAGCTCCA CAACCACCTG 60
 G 61

(2) INFORMATION FOR SEQ ID NO:20:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 62 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: both
 (D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

CGTGAGACGT CAGACAAAGG AGGCCCAGGT GTAGGTGGTC TACCAGGTGG TTGTGGAGCT 60
 CT 62

(2) INFORMATION FOR SEQ ID NO:21:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 195 base pairs
 (B) TYPE: nucleic acid
 (C) STRANDEDNESS: both
 (D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

CCGCAGAGCA CCTCCACCAT CTCCTTGTCC TACTCCAAGA TCTGGCCCTA GTCCATGTTT 60
 GCCTACACCA GATCCTCCTC CAGAACCAAG TCCTACAGGT TGGGGACCAC CAGATGGAGG 120
 TAGAGCTGCA CTTGTACGAA GAGCTCCACA ACCACCTGGT AGACCACCTA CACCTGGGCC 180
 TCCTTTGTCT GACGT 195

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